

AUDIT REPORT - MUNICIPAL SOLID WASTE LANDFILL  
FACILITIES  
OF  
HANJER BIOTECH ENERGIES PVT. LTD.

PREPARED BY  
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## TABLE OF CONTENTS

AUDIT OF MUNICIPAL SOLID WASTE MANAGEMENT – SANITARY LANDFILL FACILITIES .....	1
TABLE I - OVERVIEW OF LANDFILL LOCATION & STATUS.....	1
TABLE II - OVERVIEW OF REQUIRED ESMS & IT’S IMPLEMENTATION.....	4
TABLE III. COMPLIANCE OF LANDFILLS WITH FUND PERFORMANCE STANDARDS .....	14
TABLE III. SPECIFIC LANDFILL ACTIVITIES TO BE ADDRESSED AS PER AESR.....	23
a. Pre Construction Phase .....	23
b. Construction Phase.....	29
c. Landfill Operations .....	43
d. Monitoring Requirements as per AESR.....	48
PART B: Evaluation of Rajkot Design Documentation .....	54
PART C: Conclusions.....	56
Annexures: Audit Documents submitted by HBEPL	

**AUDIT OF MUNICIPAL SOLID WASTE MANAGEMENT – SANITARY LANDFILL  
 FACILITIES  
 HANJER BIOTECH ENERGIES PVT. LTD.**

ICLEI - SA had prepared an over view and check list for auditing municipal solid waste management landfills owned/operated by Hanjer Biotech Energies Pvt. Ltd based on Applicable Environmental & Social Regulation (IFC performance standards, World Bank sectoral guidelines on EHS, applicable Indian regulation). Subsequent to acceptance by client, the team consisting of Ms. Soumya Chaturvedula and Mr. Pravinjith K.P. visited all eight landfill sites and completed the audit in the months of February and March, 2012.

An over view of the sites visited and their location and current status are to be found below in Table I:  
**TABLE I - OVERVIEW OF LANDFILL LOCATION & STATUS**

S. No	Land Fill Site	Date of Site Visit	Location & Status
1.	Pune	21.02. 2012	<ul style="list-style-type: none"> <li>• Landfill site located at a distance of 5 kms. from Fursungi, Davarchi &amp; Urli Villages.</li> <li>• Landfilled is half-filled to ground level</li> <li>• Leachate treatment system is to be significantly strengthened.</li> <li>• The HDPE liner system is compromised at various places</li> </ul>
2.	Vasai Virar	22.02. 2012	<ul style="list-style-type: none"> <li>• The landfill site is located in close proximity to godowns &amp; warehouses in a designated industrial area.</li> <li>• Waste filling has started 2 months ago</li> <li>• There is no evidence of leachate collection pipes and its connection to the proposed leachate tank.</li> <li>• The landfill is accessible to rag pickers and is not within a closed boundary.</li> </ul>
3.	Nagpur	23.02. 2012	<ul style="list-style-type: none"> <li>• The landfill site is located at a stone's throw distance from the residential area. The historical dumpsite is also located in the same vicinity and hence strong resistance from the neighboring community.</li> <li>• Entry of vehicles in the plant stopped for 6 to 7 months.</li> <li>• NMC stepped into to resolve the matter.</li> <li>• Construction of landfill cap is promised by M/s Hanjer as a remedial measure. Record of communication maintained with the facility</li> </ul>
4.	Jalgoan	24.02. 2012	<ul style="list-style-type: none"> <li>• There are no villages existing within 3 kms radius from the plant.</li> <li>• Water stagnation observed in stone quarry indicates occurrence of water table in close proximity to ground surface.</li> <li>• Landfill yet to be constructed</li> </ul>
5.	Faridabad	27.02. 2012	<ul style="list-style-type: none"> <li>• The plant is located on the highway in a designated industrial area.</li> <li>• No residential areas existing within 5 kms from the plant.</li> </ul>

			<ul style="list-style-type: none"> <li>• There are two cells in the land fill. One cell is used for the dumping of historical waste. The second cell is currently being filled with rejects from the processing plant.</li> <li>• No leachate collection system is evident in the cell where historical waste has been dumped.</li> </ul>
6.	Agra	28.02. 2012	<ul style="list-style-type: none"> <li>• Dumping of waste is on-going</li> <li>• There is a bore well existing near the boundary of the plant at a distance of 0.5 mtrs</li> <li>• GCL is provided instead of 90cm of clay lining.</li> </ul>
7.	Mangalpur	29.02. 2012	<ul style="list-style-type: none"> <li>• Leachate tank very close to the fly ash pond</li> <li>• Runoff from the surrounding site is getting collected in the cell.</li> <li>• Site located on a filled open cast mine</li> <li>• Fly ash embankment and side slopes with fly-ash may result in instability – subsidence is already observed in the landfill base.</li> </ul>
8.	Salem	02.03.2012	<ul style="list-style-type: none"> <li>• Landfill site is under construction – not operational as yet.</li> </ul>

HBEPL submitted the following documents to ascertain the status of implementation of EMP in each of these sites:

Agra

- Design Documents – layout, leachate sump design, side slopes, base liner configuration

Jalgaon

- Emergency Response System
- SOP for landfilling
- Authorization
- Geotextile test Certificate
- HR Policy Guidelines
- Design Documents - layout, leachate sump design, side slopes, base liner configuration

Pune

- Index
- Authorization
- Emergency Response System
- SOP for landfilling
- Geotextile test Certificate
- HR Policy Guidelines
- Design Documents - layout, leachate sump design, side slopes, base liner configuration

Vasai

- Authorization
- Geotextile test Certificate
- SOP for landfilling

- Emergency Response System
- HR Policy Guidelines
- Design Documents - layout, leachate sump design, side slopes, base liner configuration

Mangalpur

- Authorization from PCB
- HR Policy Guidelines
- Onsite Emergency Plan
- SOP for landfilling

Salem

- HR Policy Guidelines
- Onsite Emergency Plan
- SOP for landfilling

The detailed report below is structured in three parts.

Part A consists of tables II, III and IV (A,B,C and D) – with observations which are common for all the sites – as per the AESR format submitted to HBEPL earlier.

Part B consists of observations specific to the design documents sent for Rajkot site – which the audit team has received after conducting the audits. It is indicated that these design documents have been applied to all other sites audited by the team. It is to be noted that we have not audited the Rajkot site and hence cannot comment on the applicability of these design criteria on-ground or of their relevance to sites audited by us.

Part C consists of conclusions/recommendations for all the landfill sites audited by us.

We have not given site specific observations, since all the sites have the same design and similar status of implementation.

**PART A: Detailed Audit Results**

The status of the Environmental & Social Monitoring System (ESMS) with respect to specific activities relevant to each performance standard and HBEPL landfill facilities’ compliance of the same may be found in table II.

Audit results based on generic activities to be undertaken as per IFC fund performance standards are given in table III.

Detailed audit results based on specific activities to be implemented in the landfills as per desired ESMS for all three phases -Pre – construction, Construction and Operations phase, are given in tables IV – A, B and C respectively.

Table IV – D gives the status of monitoring of the landfill facilities as is required by the AESR.

**TABLE II - OVERVIEW OF REQUIRED ESMS & IT’S IMPLEMENTATION**

Hanjer Biotech Energies Pvt. Ltd. should have prepared relevant ESMS and Standard Operating Procedures for the aspects noted in the following table, as are relevant to their operations. At a minimum aspects mentioned below should have been covered by the ESMS and SOP documents. However, the observations column indicates the status of the SOP and status of implementation of mentioned plan objectives and specific activities.

S. No	Management Plan Objectives	Specific Activities	Monitoring Mechanism	Relevant Client Documentation	Observations
1.	Assessment and Management of Environmental and Social Risks and Impacts Performance – (IFC - PS 1)				
	<ul style="list-style-type: none"> <li>• Preparation of relevant Environmental &amp; Social Management Systems (ESMS)</li> <li>• Adopt a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimize, and where residual impacts remain, compensate/offset for risks and impacts to workers, Affected Communities, and the environment</li> <li>• Promote improved environmental and social performance of clients</li> </ul>	<ul style="list-style-type: none"> <li>• Identify and evaluate environmental and social risks and impacts of the project.                             <ul style="list-style-type: none"> <li>○ Emission to air</li> <li>○ Discharge to water body</li> <li>○ Land contamination/ nuisance</li> <li>○ Waste Management</li> <li>○ Use of Raw Materials and resources</li> <li>○ Other local environmental and community issues</li> </ul> </li> <li>• Identification of appropriate management team and implementation team for implementing and monitoring ESMS</li> <li>• Inclusion of an Emergency Preparedness and Response system as part of the ESMS</li> </ul>	Annual review of all aspects/impacts/implementation through internal & external audits and preparation of annual register addressing all identified activities	Relevant documents not available with the clients	<ul style="list-style-type: none"> <li>• The EMP existing for the processing facility needs to be adequately strengthened and supplemented to include all environmental and social risks relevant to the landfill activities.</li> <li>• A master plan showing the SLF needs to be prepared with the wind rose marked on it.</li> <li>• Air quality needs to be monitored - upwind (one sample) and downwind</li> </ul>

S. No	Management Plan Objectives	Specific Activities	Monitoring Mechanism	Relevant Client Documentation	Observations
	through the effective use of management systems • Ensure that grievances from Affected Communities and external communications from other stakeholders are responded to and managed appropriately.	• Preparation of SOP for monitoring ESMS and other statutory compliance • Effective stakeholder engagement and communication strategy • Appropriate community grievance redressal mechanism • Client shall identify environmental impacts from considering normal, abnormal and emergency situations • Client shall also identify minor, moderate and major impacts based on scale and degree of damage that can be done to environmental components. An appropriate emergency preparedness and response policy and relevant SOPs shall be prepared • Client shall prepare a register of environmental & social aspects and associated impacts and mitigation measures.			(two samples). • The quantity of water discharged should be measured along with the characteristics. Currently, no ETP exists, hence all the water is assumed to be percolating the ground • The existing waste dump is adjacent to the SLF, and no baseline measurement exists to compare. • There is a need to carry out Geological and hydrogeological investigations.
<b>2. ESMS Roles and Responsibility (IFC – PS 1)</b>					
	To define and communicate role, responsibilities and authority for effective functioning of ESMS.	• Client shall comply with the relevant applicable policies such as environmental, quality and fund standard guidelines • Shall define roles, responsibilities and authorities w.r.t EHS and applicable social guidelines from statutory bodies • Monitoring of effective implementation, Compliance to rules/acts • Initial training needs to be addressed and provide awareness and competence • Calibration and Maintenance of HSE equipment • Maintenance of updated On –Site Emergency Plan	ESMS responsibility matrix	Relevant documents not available with the clients	To be demonstrated in plant specific EMP.

S. No	Management Plan Objectives	Specific Activities	Monitoring Mechanism	Relevant Client Documentation	Observations
		<ul style="list-style-type: none"> <li>• Handling and investigation of incidents/ accidents, non-conformities, taking action to mitigate impacts and completing corrective and preventive actions</li> <li>• Conduct internal EHS &amp; social compliance audits.</li> </ul>			
<b>3. Legal Requirements (IFC – PS 1)</b>					
	<p>To lay down a procedure to identify and have access to all relevant legal and other environmental, occupational and labor legislation requirements on regular basis and communicate to employees, interested parties and stakeholders.</p>	<ul style="list-style-type: none"> <li>• Consolidated the list of applicable regulatory in the form of “Register of Legislation” as applicable to the operation of HBEPL. The register shall consist of:                             <ul style="list-style-type: none"> <li>○ Pollution Control Act, Rules and Notification – CPCB and state pollution control boards</li> <li>○ IFC performance guidelines and World Bank EHS guidelines and sector specific guidelines on EHS</li> <li>○ Environmental Publications on Legislation for waste management facilities, including and not restricted to MSW Rules 2000</li> <li>○ Environmental Legislation Update News Letter</li> <li>○ Any other communication from regulatory body especially of MoEF, CPCB, State PCBs, Directorate of Industries and others</li> <li>○ Corporate requirement on HSE related matters</li> </ul> </li> <li>• Verification of compliance with respect to Procedural requirements &amp; monitoring requirement</li> <li>• Register of Licenses and status records.</li> </ul>	<p>Annual evaluation of compliance or as and when rule/legislation get amended or modified</p>	<p>Relevant documents not available with the clients</p>	<ul style="list-style-type: none"> <li>• Hanjer has a full-fledged statutory compliance department headquartered at its head office in Mumbai which takes care of all the applicable statutory compliances and communications.</li> <li>• The list should be maintained at individual plant sites - not available for verification.</li> </ul>
<b>4. Communication &amp; Consultation (IFC – PS 1)</b>					



S. No	Management Plan Objectives	Specific Activities	Monitoring Mechanism	Relevant Client Documentation	Observations
	To lay down procedures for consultation and communication, both internal & external in relation to EHS.	<ul style="list-style-type: none"> <li>• Suggestions from all employees through Internal Communication</li> <li>• Policy will be communicated to all employees through training and displaying at various prominent locations</li> <li>• External Communication protocol.</li> </ul>	Maintaining the communication records	Relevant documents not available with the clients	<ul style="list-style-type: none"> <li>• Communication records are maintained at the plant as well as the corporate office - not available for verification.</li> </ul>
<b>5.</b>	<b>Training &amp; Awareness (IFC – PS 1)</b>				
	To lay down the procedure for identification of training needs and providing appropriate training to all employees and contract employees to ensure effective implementation of ESMS at all level and functions. The client shall identify the necessary training needs at all level and functions.	The training shall in general address the following areas : <ul style="list-style-type: none"> <li>• General Awareness Training                             <ul style="list-style-type: none"> <li>○ General awareness and employees roles and responsibilities in achieving conformance with policy, objective and targets</li> <li>○ Relevant EHS &amp; Labour laws rules and regulations.</li> </ul> </li> <li>• EHS &amp; Social Induction Training                             <ul style="list-style-type: none"> <li>○ policy goals and objectives</li> <li>○ Applicable legislative requirements</li> <li>○ Requirements that are conditions of employment</li> <li>○ Benefits of improved personal performance</li> <li>○ The potential consequence of deviation from specified operating procedures</li> <li>○ Emergency preparedness and response.</li> </ul> </li> <li>• Job Specific Training                             <ul style="list-style-type: none"> <li>○ The potential consequence of deviation from specified operating procedures.</li> <li>○ SOP/WIs for the work areas and occupational hazards of their activities</li> <li>○ Emergency preparedness and response.</li> </ul> </li> </ul>	Maintaining appropriate training records and periodic review	Relevant documents not available with the clients	<ul style="list-style-type: none"> <li>• It has been informed that all landfill employees are imparted training on EHS and job by the EHS training team once every quarter and reviewed by the DGM - EHS periodically.</li> <li>• Training records to be maintained for the SLF staff. There is no organogram for SLF sites.</li> </ul>
<b>6.</b>	<b>Emergency Preparedness &amp; Response Plan (IFC – PS 1)</b>				
	To establish and maintain procedures in order to identify potential foreseeable accidents/	<ul style="list-style-type: none"> <li>• Some of the key activities include:                             <ul style="list-style-type: none"> <li>○ Maintain all fire extinguishers in working condition</li> </ul> </li> </ul>	Annual review of Emergency Plan implementation and contents	Relevant documents not available with the clients	<ul style="list-style-type: none"> <li>• It has been informed that there is an onsite emergency plan in place</li> </ul>

S. No	Management Plan Objectives	Specific Activities	Monitoring Mechanism	Relevant Client Documentation	Observations
	emergency situations and to prevent, control and mitigate the associated environmental impacts and Occupational Health & Safety risks and to test effectiveness of such procedure. Prepare an emergency response plan and disaster management plan as per applicable norms and include as part of ESMS documentation.	<ul style="list-style-type: none"> <li>○ Provide training to employees on fire fighting</li> <li>○ Explosion Prevention</li> <li>○ Explosive Mitigation</li> <li>○ Corrective and Preventive action</li> <li>○ Avoidance of Major Spillage of any chemical</li> <li>○ Create appropriate accident response systems.</li> </ul>			and a mock drill is conducted every 6 months at the site. <ul style="list-style-type: none"> <li>● However, records need to be maintained and furnished.</li> <li>● The landfill site shall be maintained free of dry bushes and shrubs which may lead to fire hazards</li> </ul>
<b>7. Non-Conformity, Corrective &amp; Preventive Actions (IFC – PS 1)</b>					
	The client shall establish, maintain documented records of accidents, incidents, operating procedures defining the responsibilities and authority for identifying and investigating non-conformance and taking action to improve the ESMS Performance.	<ul style="list-style-type: none"> <li>● Non-conformance which may affect the EHS performance shall be identified through :                             <ul style="list-style-type: none"> <li>○ Reporting incidents (including near misses)</li> <li>○ Carryout investigation to find out the root causes of accidents and incidents.</li> <li>○ Maintaining corrective &amp; preventive action &amp; maintaining records.</li> <li>○ The SOPs shall be suitably amended to address the reason for change.</li> <li>○ Suggestions shall be drawn for mitigating the consequences of accidents and avoiding the reoccurrence of accidents/incidents.</li> <li>○ Establishing procedures for identification of non- conformance based on results of mock drill of on-site emergency plan.</li> </ul> </li> </ul>	Periodic audit reports	Relevant documents not available with the clients	<ul style="list-style-type: none"> <li>● SOPs need to be defined and appropriate reporting, monitoring and feed-back mechanisms are to be in place.</li> <li>● Hanjer management can make use of it's video conferencing facility to monitor and follow up on such issues</li> </ul>
<b>8. Labour &amp; Working Conditions ( IFC: PS – 2)</b>					

S. No	Management Plan Objectives	Specific Activities	Monitoring Mechanism	Relevant Client Documentation	Observations
	Preparation of relevant policy and implementation measures in line with fund performance standards.	<ul style="list-style-type: none"> <li>• The client shall implement policies specific to direct workers, contract workers and supply chain workers, as laid out in PS - 2.</li> <li>• Define HR policies that are consistent with fund performance standards, specifying appropriate fund performance standards and terms of employment</li> <li>• Provide an appropriate and fair grievance redressal mechanism</li> <li>• Specify guidelines for workers engaged by third party/contractors and specify procedures for monitoring the ESMS of the contractors.</li> <li>• Provide an appropriate guideline to all primary suppliers in line with applicable guidelines specified in fund PS 2.</li> </ul>	Annual review of aspects and associated implementation and mitigation measures through internal & external audits	Except HR Policies the other Relevant documents not available with the clients.	<ul style="list-style-type: none"> <li>• HR policy of Hanjer Company shared with ICLEI - SA.</li> <li>• The organogram of landfill site staff needs to be prepared.</li> <li>• Appropriate records need to be maintained and produced during the audits.</li> </ul>
<b>9. Occupational Health , Safety and Associated Risks ( IFC: PS – 2)</b>					
	The client shall identify the occupational health and safety (OHS) hazards and the associated risks on an ongoing basis.	<ul style="list-style-type: none"> <li>• While identifying occupational health and safety (OH&amp;S) hazards and risk during initial OH&amp;S review the following criteria should be considered.                             <ul style="list-style-type: none"> <li>○ All activities where previous records of incidents, accident occurred.</li> <li>○ Inputs from regular plant visits and meetings.</li> <li>○ All activities routine and non-routine, where substantial hazards and risks are involved including contracted &amp; company own activities / facilities.</li> <li>○ Evaluation of feedback from investigation of previous incidents/accidents</li> <li>○ Examination of all existing OH&amp;S procedures and practices.</li> </ul> </li> </ul>	Annual review of aspects and associated implementation and mitigation measures through internal & external audits	Relevant documents not available with the clients	<ul style="list-style-type: none"> <li>• Appropriate records and documentation need to be maintained and regularly monitored. Roles and responsibilities need to be assigned and reported.</li> </ul>

S. No	Management Plan Objectives	Specific Activities	Monitoring Mechanism	Relevant Client Documentation	Observations
		<ul style="list-style-type: none"> <li>• While identifying significant OH&amp;S risks consideration shall also be given to                             <ul style="list-style-type: none"> <li>○ Chemical hazards,</li> <li>○ Physical hazards,</li> <li>○ Biological hazards</li> <li>○ Monotonous work</li> <li>○ Hazard Due to layout and design deficiency.</li> </ul> </li> <li>• Prepare a Register of OH&amp;S hazards and associated risks, which shall include the departments &amp; facility layout chart.</li> </ul>			
<b>10.</b>	<b>Resource Efficiency &amp; Pollution Prevention (IFC – PS 3)</b>				
	<p>To define a policy to address the following issues:</p> <ul style="list-style-type: none"> <li>• To avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities.</li> <li>• To promote more sustainable use of resources, including energy and water.</li> <li>• To reduce project-related GHG emissions.</li> </ul>	<ul style="list-style-type: none"> <li>• Define ambient environmental conditions in all sites and if applicable, implementing mitigation measures to prevent further negative impacts</li> <li>• Identify scope for implementation of technically &amp; financially viable resource efficiency (energy, water &amp; material inputs) and pollution prevention activities, including GHG emission reduction</li> <li>• Assessment of GHG emissions from project activities. Annual assessment for all activities producing over 25000 tCO<sub>2</sub>e annually.</li> <li>• Inclusion of water conservation measures to reduce total demand of water resources</li> <li>• Avoiding waste generation, if unavoidable reducing and recycling as appropriate. Identification of hazardous waste generation and appropriate disposal according to Hazardous Waste Management &amp; Handling Rules, MoEF, India</li> <li>• Inclusion of implementation and</li> </ul>	Implementation monitoring and periodic review	Relevant documents not available with the clients	<ul style="list-style-type: none"> <li>• Environmental baseline needs to be established. Few reports on water quality are available - can be considered as baseline, if pre-construction monitoring records are not available with the Municipal authority or with Hanjer.</li> <li>• Existing dumpsites should be capped after providing gas capture systems.</li> <li>• Hanjer presently is generating VERs out of its processing facilities and it will be extended to cover the landfills once the landfills are fully operational.</li> <li>• Strong monitoring and reporting systems need to be in place to meet with the requirements of the AESR.</li> </ul>

S. No	Management Plan Objectives	Specific Activities	Monitoring Mechanism	Relevant Client Documentation	Observations
		monitoring of such activities in the AESR			
11.	Community Health, Safety & Security (IFC – PS 4)				
	<ul style="list-style-type: none"> <li>To anticipate and avoid adverse impacts on the health and safety of the Affected Community during the project life from both routine and non-routine circumstances.</li> <li>To ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the Affected Communities.</li> </ul>	<ul style="list-style-type: none"> <li>Identification of neighbouring communities which may be impacted by activities related to the facility</li> <li>Identification of potential impacts and mitigation actions in relation to: infrastructure design &amp; equipment design &amp; safety, hazardous material management &amp; safety, impact on ecosystem services (air, water, soil, biodiversity), community exposure to disease vectors/unhygienic conditions, risk of communicable diseases related to labour migration</li> <li>Relevant monitoring of potential impacts and impact of mitigation activities</li> <li>Document emergency preparedness and response activities, resources, and responsibilities, and disclose appropriate information to Affected Communities, relevant government agencies, or other relevant parties.</li> <li>Employment of appropriate safety personnel, trained adequately in the use of force (and where applicable, firearms), and appropriate conduct towards the community and provide appropriate grievance redressal mechanism</li> </ul> <p>All above activities to be included in the ESMS.</p>	Annual review of aspects and associated implementation and mitigation measures through internal & external audits	Relevant documents not available with the clients	<ul style="list-style-type: none"> <li>Hanjer typically employs a Public Relations Officer (PRO) to handle issues related to the community. However, a standardized procedure needs to be in place to record and address any such grievances. Vasai - Virar and Jalgaon plants are close to habitation (within 200 mtrs of the site) and adequate care needs to be taken.</li> <li>The identification &amp; monitoring of the potential impacts and mitigation actions relevant to community, health &amp; services detailed in the specific activities needs to be complied with</li> </ul>
12.	Land Acquisition & Involuntary Resettlement (IFC – PS 5)				

S. No	Management Plan Objectives	Specific Activities	Monitoring Mechanism	Relevant Client Documentation	Observations
	<ul style="list-style-type: none"> <li>This Performance Standard applies to physical and/or economic displacement resulting from identified types of land-related transactions mentioned in PS - 5.</li> <li>Where project impacts on land, assets, or access to assets become significantly adverse at any stage of the project, the client should consider applying requirements of this Performance Standard, even where no land acquisition or land use restriction is involved.</li> </ul>	<ul style="list-style-type: none"> <li>Situations where the applicability of PS - 5 is valid shall be identified and if required the client shall develop a Resettlement and/or Livelihood Restoration Framework outlining general principles compatible with this Performance Standard.</li> <li>establish procedures to monitor and evaluate the implementation of a Resettlement Action Plan or Livelihood Restoration Plan</li> <li>Where land acquisition and resettlement are the responsibility of the government, the client will collaborate with the responsible government agency, to the extent permitted by the agency, to achieve outcomes that are consistent with this Performance Standard.</li> </ul>	Annual review of aspects and associated implementation and mitigation measures through internal & external audits	Documents available with client related to land allocation to Hanjer.	<ul style="list-style-type: none"> <li>All the sites are allotted to Hanjer by the corporation and there is no resettlement at any of the sites.</li> </ul>
<b>13.</b>	<b>Biodiversity Conservation &amp; Sustainable Management of Living Natural Resources (IFC – PS 6)</b>				
	<p>The ESMS should also consider the following aspects:</p> <ul style="list-style-type: none"> <li>To protect and conserve biodiversity.</li> <li>To maintain the benefits from ecosystem services.</li> <li>To promote the sustainable management of living natural resources through the adoption of practices that integrates conservation needs and development priorities.</li> </ul>	<ul style="list-style-type: none"> <li>Where a project is likely to adversely impact ecosystem services, as determined by the risks and impacts identification process, a systematic review will be conducted to identify priority ecosystem services, in consultation with the community.</li> <li>The client will minimize ecosystem risks and implement mitigation measures that aim to maintain the value and functionality of priority services.</li> <li>With respect to impacts on priority ecosystem services on which the project depends, clients should minimize impacts on ecosystem services and implement measures that increase resource efficiency</li> </ul>	Annual review of aspects and associated implementation and mitigation measures through internal & external audits	Relevant documents not available with the clients	<ul style="list-style-type: none"> <li>A detailed study needs to be conducted in this regard. In sites such as Jalgaon and Mangalpur, care should be taken to see that the landfill base is 2 mtrs below ground water table.</li> <li>The Mangalpur landfill is built within an area where open cast mining is prevalent. Fly ash ponds are abutting the boundary of the site. There is a stream within 200 mtrs from the site boundary. Appropriate care should be</li> </ul>

S. No	Management Plan Objectives	Specific Activities	Monitoring Mechanism	Relevant Client Documentation	Observations
		of their operations.			taken to address these aspects, both from an environmental and structural point of view. <ul style="list-style-type: none"> <li>All Hanjer plants are to cover more area under green belts in the coming monsoon.</li> </ul>
<b>14. Indigenous Peoples (IFC – P7)</b>					
	<ul style="list-style-type: none"> <li>The ESMS should also consider the rights and benefits to any indigenous people who may be affected/ influenced by project activities.</li> <li>Where relevant, adverse impacts of projects on communities of Indigenous Peoples should be avoided, or when avoidance is not possible, impacts should be minimized and/or the communities need to be compensated for such impacts.</li> </ul>	<ul style="list-style-type: none"> <li>Identification through an environmental and social risks and impacts assessment process, all communities of indigenous peoples within the project area of influence who may be affected by the project,</li> <li>Adverse impacts on affected communities of indigenous peoples should be avoided where possible.</li> <li>Where alternatives have been explored and adverse impacts are unavoidable, the client will minimize, restore, and/or compensate for these impacts in a culturally appropriate manner.</li> <li>Mitigation measures shall be in accordance with compensatory benefits listed in the fund performance standard.</li> </ul>	Preliminary risk identification documentation and subsequent annual audits of any relevant measures	-	Not Applicable.
<b>15. Cultural Heritage (IFC - PS 8)</b>					
	<ul style="list-style-type: none"> <li>To protect cultural heritage from the adverse impacts of project activities and support its preservation.</li> <li>To promote the equitable sharing of benefits from the use of cultural heritage.</li> </ul>	<ul style="list-style-type: none"> <li>The environmental &amp; social risks and impacts identification process shall also address aspects related to cultural heritage and shall identify such tangible structures that may be dealt with in accordance with norms specified in IFC – PS 8.</li> <li>Client’s ESMS policy shall address relevant aspects of this performance</li> </ul>	Preliminary risk identification documentation and subsequent annual audits of any relevant measures	-	No cultural heritage is affected by the project.

S. No	Management Plan Objectives	Specific Activities	Monitoring Mechanism	Relevant Client Documentation	Observations
		standard			

**TABLE III. COMPLIANCE OF LANDFILLS WITH FUND PERFORMANCE STANDARDS**

The following tables indicate different measures/activities to be implemented by the client to meet with the fund performance standards. The relevant client documentation/response column indicates the client’s position on each of these issues. The monitoring mechanism indicates the proposed mechanism as per the AESR.

**Audit observations are consistent for all eight sites. Where, site specific conditions are relevant site names have been mentioned.**

S. No	Management Plan Objectives	Specific Activities	Monitoring Mechanism	Relevant Client Documentation/R esponse	Audit Observations
1.	IFC - PS 1				
1.1	<ul style="list-style-type: none"> <li>Preparation of relevant Environmental &amp; Social Management Systems (ESMS)</li> </ul>	<ul style="list-style-type: none"> <li>Most of the material required on a day-to - day basis to be procured from local area only, which will provide direct and indirect employment and business opportunities to locals - included in SOP and implemented.</li> </ul>		<ul style="list-style-type: none"> <li>Not available</li> </ul>	<ul style="list-style-type: none"> <li>Relevant documentation to be maintained and furnished during audits</li> </ul>
1.2	<ul style="list-style-type: none"> <li>To provide appropriate training to all employees and contract employees to ensure effective implementation of ESMS at all level and functions. The client shall identify the necessary training needs at all level and functions.</li> </ul>	<ul style="list-style-type: none"> <li>Are landfill supervisors aware of hazardous/ unacceptable wastes? Training records? Is Record of hazardous wastes maintained?</li> <li>Regular (half yearly) training programs on the general operation of the plant, occupational health and</li> </ul>	Relevant documentation, periodically updated, monitored and reported	<ul style="list-style-type: none"> <li>No records available</li> <li>No records available</li> </ul>	<ul style="list-style-type: none"> <li>No documentation on acceptable and non-acceptable hazardous waste</li> </ul>



S. No	Management Plan Objectives	Specific Activities	Monitoring Mechanism	Relevant Client Documentation/R esponse	Audit Observations
1.3		safety and contingency plans and emergency procedures will be conducted.: Training records of employees are to be maintained in the Administration/ HSE Department. (Applicable to PS-1, PS-2 & PS-3).			<ul style="list-style-type: none"> <li>• While the landfill staff are well involved in the operations, appropriate training for all staff needs to be strengthened. Appropriate records are to be maintained.</li> </ul>
1.4		<ul style="list-style-type: none"> <li>• The following aspects are understood, planned and implemented at and by all levels in the Company: <ul style="list-style-type: none"> <li>(a) Job description</li> <li>(b) Training and other methods for new workmen upon hiring.</li> <li>(c) Periodic awareness and training of existing workmen as per training Plan.</li> <li>(d) Evaluation of effectiveness of implemented training programmes.</li> </ul> </li> </ul> (Applicable to PS-1 & PS-2).		<ul style="list-style-type: none"> <li>• No records available</li> </ul>	<ul style="list-style-type: none"> <li>• Job descriptions need to be detailed, organogram prepared and appropriate records maintained.</li> </ul>
1.5		<ul style="list-style-type: none"> <li>• Continuous monitoring of legal and statutory requirements for new and applicable laws, amendments of existing applicable national laws, rules; International requirements</li> <li>• The Company shall investigate, address and respond to the concerns of its workmen and interested parties with regard to compliance and / or noncompliance of the above policy and requirements of social accountability standards.</li> </ul>		<ul style="list-style-type: none"> <li>• No records available</li> </ul>	<ul style="list-style-type: none"> <li>• The Company has a legal and statutory department which needs to address these requirements</li> </ul>
1.6		(Applicable to PS-1 & PS-2).		<ul style="list-style-type: none"> <li>• No records available</li> </ul>	<ul style="list-style-type: none"> <li>• Appropriate mechanisms need to be institutionalized</li> </ul>

S. No	Management Plan Objectives	Specific Activities	Monitoring Mechanism	Relevant Client Documentation/R esponse	Audit Observations
2.	IFC – PS 2				
2.1	<p>Labour &amp; Working Conditions</p> <ul style="list-style-type: none"> <li>To provide all facilities to the workers and prepare relevant policy and implementation measures in line with the fund performance standards as applicable in PS -2 to maintain better working conditions for the labours &amp; workers and to ensures safeguards wherever applicable.</li> </ul>	<ul style="list-style-type: none"> <li>Workers to be provide with clean and functional toilets with systems to conserve water use (Applicable to PS-2 &amp; PS-4).</li> </ul>	<ul style="list-style-type: none"> <li>Maintenance schedules</li> </ul>	<ul style="list-style-type: none"> <li>Not available</li> </ul>	<ul style="list-style-type: none"> <li>Toilets provided in workers quarters – no maintenance schedules. On- site facilities are required during construction and operation</li> </ul>
2.2		<ul style="list-style-type: none"> <li>Wastewater to be disposed in underground sewers or connected to on-site septic tanks. (Applicable to PS-2 &amp; PS-4).</li> </ul>	<ul style="list-style-type: none"> <li>Maintenance schedules</li> </ul>	<ul style="list-style-type: none"> <li>Not available</li> </ul>	<ul style="list-style-type: none"> <li>Needs compliance</li> </ul>
2.3		<ul style="list-style-type: none"> <li>All employees will be provided with all necessary personal protective equipment, including protective clothing, eye goggles, gloves, hard hats, dust masks and safety shoes.</li> </ul>	<ul style="list-style-type: none"> <li>Store registers</li> </ul>	<ul style="list-style-type: none"> <li>Not available</li> </ul>	<ul style="list-style-type: none"> <li>PPE not being used on sites – needs compliance</li> </ul>
2.4		<ul style="list-style-type: none"> <li>Clean protective clothing will be provided by HBEPL to all employees</li> </ul>	<ul style="list-style-type: none"> <li>Store registers</li> </ul>	<ul style="list-style-type: none"> <li>Not available</li> </ul>	<ul style="list-style-type: none"> <li>Not evident</li> </ul>
2.5		<ul style="list-style-type: none"> <li>Noise protection equipment will be worn by all employees working near loud equipment.</li> </ul>	<ul style="list-style-type: none"> <li>Store registers</li> </ul>	<ul style="list-style-type: none"> <li>Not available</li> </ul>	<ul style="list-style-type: none"> <li>PPE not being used on sites – needs compliance</li> </ul>
2.6		<ul style="list-style-type: none"> <li>Clear marking of work site hazards and training in recognition of hazard symbols.</li> </ul>	<ul style="list-style-type: none"> <li>On-site inspection and records</li> </ul>	<ul style="list-style-type: none"> <li>On-site inspection</li> </ul>	<ul style="list-style-type: none"> <li>Needs compliance</li> </ul>
2.7		<ul style="list-style-type: none"> <li>All men and women employees will be provided with separate shower facilities and change rooms with lockers.</li> </ul>	<ul style="list-style-type: none"> <li>Maintenance schedules</li> </ul>	<ul style="list-style-type: none"> <li>Not part of company policy</li> </ul>	<ul style="list-style-type: none"> <li>Not evident</li> </ul>
					<ul style="list-style-type: none"> <li>Part of office building,</li> </ul>

S. No	Management Plan Objectives	Specific Activities	Monitoring Mechanism	Relevant Client Documentation/R esponse	Audit Observations
2.8		<ul style="list-style-type: none"> <li>A well ventilated, clean lunch facility of sufficient capacity will be provided by HBEPL to accommodate the employees on an appropriate rotational basis.</li> </ul>	<ul style="list-style-type: none"> <li>On-site inspection</li> </ul>	<ul style="list-style-type: none"> <li>On-site inspection</li> </ul>	<ul style="list-style-type: none"> <li>except in Agra – under construction in Agra. Landfill workers need to be permitted to use the facility.</li> </ul>
2.9		<ul style="list-style-type: none"> <li>Accumulation of dirt is removed daily by sweeping. Bathrooms and toilets are cleaned on daily basis. Washing disinfectants are used to clean the floor of such places on a daily basis.</li> </ul>	<ul style="list-style-type: none"> <li>Maintenance schedules</li> </ul>	<ul style="list-style-type: none"> <li>Maintenance schedules maintained</li> </ul>	<ul style="list-style-type: none"> <li>Maintenance schedules are being maintained – not provided for verification</li> </ul>
2.10		<ul style="list-style-type: none"> <li>HBEPL shall ensure that sufficient nos. of latrines and urinals both male and female are provided at conveniently situated locations. Latrines and Urinals are to be properly lighted, ventilated and kept cleaned at all time.</li> </ul>	<ul style="list-style-type: none"> <li>Maintenance schedules</li> </ul>	<ul style="list-style-type: none"> <li>Facility not available</li> </ul>	<ul style="list-style-type: none"> <li>Facility to be provided</li> </ul>
2.11		<ul style="list-style-type: none"> <li>HBEPL Shall have a policy (SOP) which completely prohibits, in its establishments, employment or engagement of any child and even young workers (persons who have not completed the age of 18 years).</li> </ul>	<ul style="list-style-type: none"> <li>HR policy</li> </ul>	<ul style="list-style-type: none"> <li>HR policy submitted to ICLEI</li> </ul>	<ul style="list-style-type: none"> <li>Included as part of HR policy–needs compliance in terms of provision of day care/education facilities for labourer’s children.</li> </ul>
2.12		<ul style="list-style-type: none"> <li>HBEPL shall ensure: <ol style="list-style-type: none"> <li>Endeavor to maintain continuous good understanding between management and employee.</li> <li>Promote settlement of differences and disputes through bilateral negotiations.</li> </ol> </li> </ul>	<ul style="list-style-type: none"> <li>HR policy</li> </ul>	<ul style="list-style-type: none"> <li>HR policy submitted to ICLEI</li> </ul>	<ul style="list-style-type: none"> <li>Included as part of HR policy. Appropriate grievance redressal mechanism should be institutionalized.</li> </ul>

S. No	Management Plan Objectives	Specific Activities	Monitoring Mechanism	Relevant Client Documentation/R esponse	Audit Observations
2.13		3.Promote security of the employment of employees. 4.Ensure safety, health and job satisfaction. 5.Take measure for good and harmonious work environment. 6.Promote and discuss matter of mutual interest for better labour management relation. 7.To avoid sexual harassment. 8.Labour representatives have full freedom to meet employees in any case at any time during working hours.  • Company shall draw up Standing Order as per act 1946 duly approved by labour commissioner of city/state where HBEPL operates. The Standing Order includes the importance of time punctuality, honest duty, not going out of factory in factory timing, no smoking, no chewing petal chew, clean work place, employee should have a identity card, etc.	<ul style="list-style-type: none"> <li>• Appropriate records are maintained</li> </ul>	<ul style="list-style-type: none"> <li>• Appropriate records are maintained</li> </ul>	<ul style="list-style-type: none"> <li>• Appropriate records are maintained but not available for verification</li> </ul>
2.14	Occupational Health , Safety and Associated Risks				
	<ul style="list-style-type: none"> <li>• The client shall identify the occupational health and safety (OHS) hazards and the associated risks on an ongoing basis.</li> </ul>	<ul style="list-style-type: none"> <li>• Earplugs to be provided to the Personnel working in high noise area (greater than or equal to 90 dB(A).</li> <li>• Health screening of all site personnel will be performed at least twice a year. (Applicable to PS-2 &amp; PS-3).</li> </ul>	<ul style="list-style-type: none"> <li>• Store records to be maintained</li> <li>• Appropriate records to be maintained and</li> </ul>	<ul style="list-style-type: none"> <li>• Store records not being maintained for landfill site</li> <li>• Records are maintained</li> </ul>	<ul style="list-style-type: none"> <li>• Store records not being maintained for landfill site</li> <li>• Records not furnished</li> </ul>

S. No	Management Plan Objectives	Specific Activities	Monitoring Mechanism	Relevant Client Documentation/R esponse	Audit Observations
2.16		<ul style="list-style-type: none"> <li>In case of minor injury/disease HBEPL shall provide First Aid boxes in all working areas, where first aid is given to the employees. (Applicable to PS-2 &amp; PS-3).</li> </ul>	requisite follow-up is scheduled <ul style="list-style-type: none"> <li>First –aid box to be made available at site and store records maintained</li> </ul>	<ul style="list-style-type: none"> <li>Store records are maintained</li> </ul>	<ul style="list-style-type: none"> <li>Records not furnished</li> </ul>
2.17		<ul style="list-style-type: none"> <li>The quality of potable water is also checked through recognized agency annually. The records of same shall be maintained by the Admin department.</li> </ul>	<ul style="list-style-type: none"> <li>Periodic review of records and appropriate action taken is recorded</li> </ul>	<ul style="list-style-type: none"> <li>Records furnished for some sites</li> </ul>	<ul style="list-style-type: none"> <li>The quality of potable water needs to be checked in all sites. Records furnished, but source of sample and use is unknown.</li> </ul>
2.18		<ul style="list-style-type: none"> <li>The management shall ensure effective arrangement of drinking water at suitable points conveniently situated for all employees.</li> </ul>	<ul style="list-style-type: none"> <li>On-field verification</li> </ul>	<ul style="list-style-type: none"> <li>Drinking water provided</li> </ul>	<ul style="list-style-type: none"> <li>Drinking water provision is made in all sites – but hygienic conditions should be maintained around dispensers and quality check records need to be maintained.</li> </ul>
2.19		<ul style="list-style-type: none"> <li>The company shall arrange a comprehensive program for the safety of the employees in case of natural calamities like fire, earthquake, flooding, electric shocks, etc. In this regard (i.e. disaster management plan). (Applicable to PS-2 &amp; PS-4).</li> </ul>	<ul style="list-style-type: none"> <li>Emergency management plan</li> </ul>	<ul style="list-style-type: none"> <li>The company is in the process of defining the same for the landfill facilities</li> </ul>	<ul style="list-style-type: none"> <li>To be appropriately addressed by the company</li> </ul>
2.20		<ul style="list-style-type: none"> <li>A Worker safety Committee (WSC) shall be formed and perform tasks as scheduled in the EMP. (Applicable to PS-2 &amp; PS-4).</li> </ul>	<ul style="list-style-type: none"> <li>A Worker safety Committee (WSC) proceedings</li> </ul>	<ul style="list-style-type: none"> <li>To be formed for the landfill facilities</li> </ul>	<ul style="list-style-type: none"> <li>To be complied with</li> </ul>

S. No	Management Plan Objectives	Specific Activities	Monitoring Mechanism	Relevant Client Documentation/R esponse	Audit Observations
2.21		<ul style="list-style-type: none"> <li>At HBEPL effective and efficient fire arrangements shall be made. Records of safety related issues are maintained as follows: -                             <ol style="list-style-type: none"> <li>Inspection register of fire extinguishers and alarm.</li> <li>Fire Drill record.</li> <li>First-Aid training record.</li> <li>Fire Safety training record</li> <li>Accident Register.</li> </ol>                             (Applicable to PS-2 &amp; PS-4).                         </li> </ul>	<ul style="list-style-type: none"> <li>Emergency management plan</li> </ul>	<ul style="list-style-type: none"> <li>The company is in the process of defining the same for the landfill facilities</li> </ul>	<ul style="list-style-type: none"> <li>To be appropriately addressed by the company</li> </ul>
2.22		<ul style="list-style-type: none"> <li>Under the health care program of the company, all employees are registered with the Employees State Insurance Corporation, The records are kept in the Administrative department.</li> </ul>	<ul style="list-style-type: none"> <li>Relevant records</li> </ul>	<ul style="list-style-type: none"> <li>Being complied with</li> </ul>	<ul style="list-style-type: none"> <li>Needs compliance</li> </ul>
2.23		<ul style="list-style-type: none"> <li>HBEPL to arrange and document a comprehensive program and procedure to identify risks relating to Health and Safety arising from the plant's activities: Regular on-site training. Regular staff checks, System checks and field tests of emergency procedures by the Operations Manager &amp; Environmental Engineer.</li> </ul>	<ul style="list-style-type: none"> <li>Relevant records</li> </ul>	<ul style="list-style-type: none"> <li>Being complied with</li> </ul>	<ul style="list-style-type: none"> <li>Needs compliance</li> </ul>
<b>3.</b>	<b>(IFC – PS 3)</b>				

S. No	Management Plan Objectives	Specific Activities	Monitoring Mechanism	Relevant Client Documentation/R esponse	Audit Observations
3.1	To define a policy to address the following issues: <ul style="list-style-type: none"> <li>To avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities.</li> <li>To promote more sustainable use of resources, including energy and water and</li> <li>To reduce project-related GHG emissions.</li> <li>To define ambient environmental conditions in all sites and if applicable, implementing mitigation measures to prevent further negative impacts</li> </ul>	<ul style="list-style-type: none"> <li>Trucks tracking waste outside the landfill?</li> </ul>	<ul style="list-style-type: none"> <li>On-site verification</li> </ul>	<ul style="list-style-type: none"> <li>Roads within the facility are BT/Concrete roads – onsite verification</li> </ul>	<ul style="list-style-type: none"> <li>Dust reduction measures have to be employed in all sites – wind breakers on either side of the road to be installed</li> </ul>
3.2		<ul style="list-style-type: none"> <li>Roads within the facility are dirt/BT? If dirt - are they watered down?</li> </ul>	<ul style="list-style-type: none"> <li>On-site verification</li> </ul>	<ul style="list-style-type: none"> <li>Will be provided as required</li> </ul>	<ul style="list-style-type: none"> <li>Truck ramp to be appropriately designed and tyre wash facilities are recommended</li> </ul>
3.3		<ul style="list-style-type: none"> <li>Separate storage areas with appropriate concrete pads for storage of hazardous wastes, oils (Applicable to both PS-3 &amp; PS-4).</li> </ul>	<ul style="list-style-type: none"> <li>On-site verification</li> </ul>	<ul style="list-style-type: none"> <li>Agreements are in-force with wasteoil dealers for the integrated facilities – same shall apply here.</li> </ul>	<ul style="list-style-type: none"> <li>To be complied with</li> </ul>
3.4		<ul style="list-style-type: none"> <li>Appropriate disposal of scrap and used oil.</li> </ul>	<ul style="list-style-type: none"> <li>Appropriate disposal of scrap and used oil.</li> </ul>	<ul style="list-style-type: none"> <li>Appropriate signage is being installed</li> </ul>	<ul style="list-style-type: none"> <li>Appropriate documentation is to be maintained. disposal of scrap and used oil.</li> </ul>
3.5		<ul style="list-style-type: none"> <li>Minimization of vehicle speed - 15 kmph within the premises to prevent fugitive dust emissions - appropriate signage.</li> </ul>	<ul style="list-style-type: none"> <li>On –site verification</li> </ul>	<ul style="list-style-type: none"> <li>Enforced</li> </ul>	<ul style="list-style-type: none"> <li>To be complied with</li> </ul>
3.6		<ul style="list-style-type: none"> <li>Incoming trucks are covered with tarpaulin - appropriate action (not accepted after 3 warnings) is initiated in an event of non-compliance. Appropriate register is maintained.</li> </ul>	<ul style="list-style-type: none"> <li>On –site verification and appropriate records are maintained</li> </ul>	<ul style="list-style-type: none"> <li>Records maintained for vehicles entering integrated facilities, same being adopted here</li> </ul>	<ul style="list-style-type: none"> <li>Partial compliance in all sites – needs stricter enforcement</li> </ul>
3.7					

S. No	Management Plan Objectives	Specific Activities	Monitoring Mechanism	Relevant Client Documentation/R esponse	Audit Observations
3.8		<ul style="list-style-type: none"> <li>Incoming vehicles Pollution Under Check certificates are checked every 3 months and records maintained.</li> </ul>	<ul style="list-style-type: none"> <li>Verification of records</li> </ul>	<ul style="list-style-type: none"> <li>Done</li> </ul>	<ul style="list-style-type: none"> <li>Needs compliance</li> </ul>
3.9		<ul style="list-style-type: none"> <li>Cleaning of surfaced roads and wetting of un-surfaced roads.</li> </ul>	<ul style="list-style-type: none"> <li>On-site verification</li> </ul>	<ul style="list-style-type: none"> <li>BT/Concrete roads</li> </ul>	<ul style="list-style-type: none"> <li>Dust control needs to be more effective on-site – wind breakers required</li> </ul>
3.10		<ul style="list-style-type: none"> <li>DG sets: Presence of Location criteria, maintenance plans, quarterly monitoring of emissions and height of DG stacks as per regulations.</li> </ul>	<ul style="list-style-type: none"> <li>Records verification</li> </ul>	<ul style="list-style-type: none"> <li>Shall be adhered to when in use</li> </ul>	<ul style="list-style-type: none"> <li>Not in use currently.</li> </ul>
3.11		<ul style="list-style-type: none"> <li>30 m buffer distance from landfill foot print and site boundary to minimize adverse impact of odour, bio aerosol and dust emissions.</li> </ul>	<ul style="list-style-type: none"> <li>On-site verification</li> </ul>	<ul style="list-style-type: none"> <li>Provided where feasible</li> </ul>	<ul style="list-style-type: none"> <li>Needs to be maintained and a clear fire line to be maintained</li> </ul>
3.12		<ul style="list-style-type: none"> <li>Provision of boundary wall of height at least 2m high to act as a noise barrier.</li> <li>Provision of green belt of 7.0 to 12m width all along the periphery of the premises for further attenuation of noise levels</li> </ul>	<ul style="list-style-type: none"> <li>On-site verification</li> </ul>	<ul style="list-style-type: none"> <li>Will be provided where feasible</li> </ul>	<ul style="list-style-type: none"> <li>Needs compliance in all sites</li> </ul>
4.	(IFC – PS 4)				
4.1	<ul style="list-style-type: none"> <li>To anticipate and avoid adverse impacts on the health and safety of the Affected Community during the project life from both routine and non-routine circumstances.</li> </ul>	<ul style="list-style-type: none"> <li>Separate shed for maintenance of equipment and duly marked.</li> </ul>			
4.2	<ul style="list-style-type: none"> <li>To ensure that the safeguarding of personnel</li> </ul>	<ul style="list-style-type: none"> <li>Appropriate entry and exit mechanisms to be set up and maintained.</li> </ul>			



S. No	Management Plan Objectives	Specific Activities	Monitoring Mechanism	Relevant Client Documentation/R esponse	Audit Observations
4.3	and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the Affected Communities.	<ul style="list-style-type: none"> <li>• HBEPL is to record the no of vehicles coming to the site daily, their originating area and the vehicle number, along with the tonnage. This information can be used to stagger the timings of incoming vehicles.</li> <li>• The vehicles bringing utility raw materials need to be regulated and managed by the project in such a way that the impact during peak hours of traffic remains minimum.</li> <li>• Mandatory servicing of all in house vehicles (preventive and breakdown) to be carried out.</li> <li>• Requisite quantum of spares to be maintained.</li> </ul>	Records to be maintained for verification	Will be complied with	Needs compliance
4.4					
4.5					
4.6					

**TABLE III. SPECIFIC LANDFILL ACTIVITIES TO BE ADDRESSED AS PER AESR**

The following table indicates different measures/activities to be implemented by the client to meet with the specified AESR. The various stages and specific activities to be undertaken in each stage of landfill construction are indicated here – relevant documentation given by the client and audit observations generic to all sites are listed here.

Other than Jalgaon & Salem – all other landfill sites have completed construction and waste is being dumped. Landfill construction is yet to start in Jalgaon and Salem has just neared completion.

**A. PRE CONSTRUCTION PHASE**

Sl. No	Scope	Suggested Measures as per AESR	Applicable Regulation/ Standard/ Guideline	Relevant Client Documentation (to be filled in by the client)	Audit Observations
1.	<b>Clearances</b>	All clearances required for environmental aspects during construction shall be ensured and made available before	Compliance as per Environmental Protect Act	Completed. Documentation in Surat office	<b>Relevant documentation to be maintained at site – not</b>

Sl. No	Scope	Suggested Measures as per AESR	Applicable Regulation/ Standard/ Guideline	Relevant Client Documentation (to be filled in by the client)	Audit Observations
		start of work.	– Environmental Impact Assessment rules 2006		available at site for verification
2.	<b>Landfill Siting</b>	<p>The location of the landfill should take into account potential impacts associated with releases of polluting substances including the following:</p> <ul style="list-style-type: none"> <li>• Residential development should be typically further than 250 meters from the perimeter of the proposed landfill cell development to minimize the potential for migration of underground gaseous emissions</li> <li>• Visual impacts should be minimized by evaluating locational alternatives</li> <li>• Siting should be further than 20 km of an airport , fully considering potential threats to air safety due to attraction and presence of birds</li> <li>• Proximity and use of groundwater and surface water resources: Private or public drinking, irrigation, or livestock water supply wells located down gradient of the landfill boundaries should be further than 500 meters from the site perimeter, unless alternative water supply sources are readily and economically available and their development is acceptable to regulatory authorities and local communities</li> <li>• Areas within the landfill boundaries should be located outside of the 10-year groundwater recharge area for existing or pending water supply development.</li> <li>• Perennial stream should not be located within 300 meters down gradient of the proposed landfill cell development, unless diversion, culverting or channeling is economically and environmentally feasible to protect the stream from potential contamination.</li> <li>• Site geology and hydrogeology: Landfills should be located in gently sloped topography, amenable to development using the cell (bund method), with slopes</li> </ul>	World Bank sectoral EHS guidelines	Sites are selected by the Municipal Corporation	<p><b>Client should consider mitigation measures, where site locations are not suitable for siting landfills. The following aspects have to be given due consideration:</b></p> <ol style="list-style-type: none"> <li>1. Location of drinking water bore wells ( Agra – borewell is just 5 mtrs from edge of landfill)</li> <li>2. No geotechnical information available to assess siting issues and possible mitigation measures</li> <li>3. The ground water table is very shallow in Jalgaon, Vasai-Virar and Mangalpur – appropriate safeguards are to be implemented</li> <li>4. Slope stability has to be ascertained – dykes are formed with native earth and waste is compacted to form slopes</li> <li>5. Mangalpur site is within an open cast mine quarry – potential impacts of being an incompetent barrier for leachates and also slope stability issues - significant subsidence is already seen in this site.</li> </ol>

Sl. No	Scope	Suggested Measures as per AESR	Applicable Regulation/ Standard/ Guideline	Relevant Client Documentation (to be filled in by the client)	Audit Observations
		<p>which minimize the need for earthmoving to obtain the correct leachate drainage slope of about 2%</p> <ul style="list-style-type: none"> <li>• Groundwater's seasonally high table level (i.e., 10 year high) should be at least 2 meters below the proposed base of any excavation or site preparation to enable landfill cell development</li> <li>• Suitable soil cover material should be available on-site to meet the needs for intermediate (minimum of 30 cm depth) and final cover (minimum of 60 cm depth), as well as bund construction (for the cell method of landfill operation). Preferably, the site would have adequate soil to also meet required cover needs (usually a minimum of 15 cm depth of soil)</li> <li>• Potential threats to landfill site integrity from natural hazards such as floods, landslides, and earthquakes:</li> <li>• Landfills should be sited outside of a floodplain subject to 10-year floods and, if within areas subject to a 100-year flood, amenable to an economic design which would eliminate the potential for washout</li> <li>• There should be no significant seismic risk within the region of the landfill which could cause destruction of berms, drains or other civil works, or require unnecessarily costly engineering measures; otherwise, side slopes should be adjusted accordingly to prevent failure in the event of seismic activity</li> <li>• No fault lines or significantly fractured geologic structure should be present within 500 meters of the perimeter of the proposed landfill cell development which would allow unpredictable movement of gas or leachate</li> <li>• There should be no underlying limestone, carbonate, fissured or other porous rock formations which would be incompetent as barriers to leachate and gas migration, where the formations are more than 1.5 meter in thickness and present as the uppermost</li> </ul>			

Sl. No	Scope	Suggested Measures as per AESR	Applicable Regulation/ Standard/ Guideline	Relevant Client Documentation (to be filled in by the client)	Audit Observations
		geologic unit above sensitive ground waters.			
3.	<b>Landfill Siting</b>	<ul style="list-style-type: none"> <li>The landfill site shall be large enough to last for 20-25 years.</li> <li>The landfill site shall be away from habitation clusters, forest areas, water bodies monuments, National Parks, Wetlands and places of important cultural, historical or religious interest.</li> <li>A buffer zone of no-development shall be maintained around landfill site and shall be incorporated in the Town Planning Department's land-use plans.</li> <li>Landfill site shall be away from airport including airbase. Necessary approval of airport or airbase authorities prior to the setting up of the landfill site shall be obtained in cases where the site is to be located within 20 km of an airport or airbase.</li> </ul>	Municipal Solid waste Management & Handling Rules, 2000		<ol style="list-style-type: none"> <li><b>Landfill depths and heights and rates of dumping to be ascertained and specified. The sufficiency of the landfill depends on these parameters.</b></li> <li><b>Appropriate buffer distances must be ascertained, especially in Vasai-Virar, Pune plants and appropriate safe guards should be implemented</b></li> </ol>
3.	<b>Baseline environmental monitoring</b>	<ul style="list-style-type: none"> <li>Adequate measures shall be taken to record and control the Baseline parameters of Air, Water and Noise pollution. Base line parameters shall be recorded and ensured conformance with applicable standards till the completion of the project.</li> <li>Before establishing any landfill site, baseline data of ground water quality in the area shall be collected and kept in record for future reference. The ground water quality within 50 meters of the periphery of landfill site shall be periodically monitored to ensure that the ground water is not contaminated beyond acceptable limit as decided by the Ground Water Board or the State Board or the Committee. Such monitoring shall be carried out to cover different seasons in a year that is, summer, monsoon and post-monsoon period.</li> </ul>	Management & Handling Rules, 2000	Documentation has been submitted to ICLEI – where available	<b>The documentation submitted is scant to analyze and discern the baseline – needs to be strengthened as per guidelines. List of documentation is given in he next section.</b>
4.	<b>Planning of temporary</b>	<ul style="list-style-type: none"> <li>Temporary appropriate traffic diversions shall be made and traffic control plans shall be prepared before</li> </ul>	IFC – PS1	On- site verification	<b>1. Vehicle speed needs to be regulated</b>

Sl. No	Scope	Suggested Measures as per AESR	Applicable Regulation/ Standard/ Guideline	Relevant Client Documentation (to be filled in by the client)	Audit Observations
	<b>Traffic arrangements</b>	<p>commencement of works.</p> <ul style="list-style-type: none"> <li>The traffic control plans shall contain details of temporary diversion, details of arrangements for construction under traffic, details of traffic arrangement after cessation of work each day, signages, safety measures for transport of hazardous materials and arrangement of flagmen.</li> </ul>			<p>2. <b>Pollution Under Check certificates of vehicles allowed on site need to be verified</b></p> <p>3. <b>The landfill should be constructed so that - green belt, peripheral road is provided all around the SLF and well within the boundary</b></p>
4.	<b>Storage of materials</b>	The client shall identify the site for temporary use of land for construction sites /storage of construction materials, etc.	IFC – PS 1,2 & 3	On- site verification	<b>Photo-sensitive HDPE liner material is stored inappropriately in bundles under the sun – compromising its strength and use</b>
5.	<b>Construction of labour camps</b>	<ul style="list-style-type: none"> <li>Client shall follow all relevant provisions of the Factories Act, 1948 and the Building and the other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 for construction and maintenance of labour camp.</li> <li>The location, layout and basic facility provision of each labour camp will be well defined prior to construction.</li> <li>The client shall maintain necessary living accommodation and ancillary facilities in functional and hygienic manner</li> <li>All temporary accommodation must be constructed and maintained in such a fashion that uncontaminated water is available for drinking, cooking and washing. The sewage system for the camp must be planned. Adequate health care is to be provided for the work force. The layout of the construction camp and details of the facilities provided should be prepared</li> </ul>	Factories Act, 1948 and the Building and the other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996, IFC – PS 2		<b>Accommodation is provided in the staff quarters built inside or near the processing facility</b>
6.	<b>Planning of temporary</b>	<p>Where Applicable:</p> <ul style="list-style-type: none"> <li>Adequate measures to control and isolate runoff water</li> </ul>	IFC – PS1 & PS 3		<b>1. Stormwater management drains need to be</b>

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	<b>Storm water management facilities</b>	<p>coming in contact with any existing waste on site shall be made and the all water coming into contact with the waste is to be diverted to a storm water pond and tested. If such waters do not meet surface water discharge criteria, the same may be discharged to the leachate treatment plant for treatment and disposal.</p> <ul style="list-style-type: none"> <li>• Silt screens are to be established to mitigate migration of silt into surface water bodies. The impacted silt can later be excavated and disposed off at the landfill as part of daily over material.</li> </ul>			<p><b>appropriately designed and implemented – both site level drains to prevent run-on onto the landfill and landfill peripheral drains to drain runoff from the top cover- once top contours are reached.</b></p> <p><b>2. Impacts of run-on onto the landfill are visible in Faridabad and Salem</b></p>
7.	<b>Tree Cutting</b>	<p>Where applicable:</p> <ul style="list-style-type: none"> <li>• Try to save all existing trees by changing the alignment of the landfill</li> <li>• Provide adequate protection to the trees to be retained with tree guards (e.g. Masonry tree guards, Low-level RCC tree guards, Circular Iron Tree Guard with Bars) as required.</li> <li>• Identify the number of trees that will be affected with girth size &amp; species type within the proposed landfill foot print area. The details to be indicated in a map plan.</li> <li>• Undertake afforestation in nearby areas.</li> <li>• Compensatory plantation by way of Re-plantation of at least twice the number of trees cut should be carried out in the project area.</li> </ul>	IFC – PS 6	Not Applicable to selected sites	<b>Not applicable</b>
8.	<b>Utility Relocation</b>	<p>Where applicable:</p> <ul style="list-style-type: none"> <li>• Identify the common utilities to be affected such as: telephone cables, electric cables, electric poles, water pipelines, public water taps, etc, if any.</li> <li>• Affected utilities shall be relocated with prior approval of the concerned agencies before construction starts.</li> </ul>	IFC – PS 1	Not Applicable to selected sites	<b>Not applicable</b>
9.	<b>Relocating and disposing of existing waste</b>	<p>Where Applicable:</p> <ul style="list-style-type: none"> <li>• Any existing waste on the landfill site is to be segregated</li> </ul>	IFC – PS 3	Existing historical waste within the processing site shall be landfilled first.	<b>Records need to be appropriately maintained to record quantity of waste being</b>

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		<p>through a mechanical process of de-lumping and passing the waste over a conveyor belt for the recyclable and reusable waste to be segregated manually and then passing it through a sieve where all fines and compostable material is sieved out and the remaining inert waste within the sieve is to be collected for final disposal subsequent to the development of the landfill. The segregated waste may form the initial layer over the landfill baseliner after its construction.</p> <ul style="list-style-type: none"> <li>• The compostable material is to be diverted to a compost facility.</li> <li>• The manual labour involved in waste segregation must be provided with safety gear such as hardhats, gloves and nose masks.</li> <li>• Waste segregation work is to be completed during dry weather, as the waste tends to form lumps when wet.</li> <li>• The recyclable wastes are to be removed and transported away.</li> </ul>		Records of waste transported to landfill sites are maintained	<b>dumped and to ascertain remaining life of landfill. HBEPL to calculate life of each landfill based on waste being dumped and landfill cell volume – data insufficient to ascertain.</b>

## B. CONSTRUCTION PHASE

Sl. No	Scope	Suggested Measures as per AESR	Applicable regulation/ standard/ guideline	Verification Documentation (to be filled in by the client)	Audit Observation/Remarks
I	<b>General Requirements – For all Phases of Landfill Construction/Operation</b>				
1.	<b>Shifting of common utilities</b>	Concerned Departments are to confirm and inform the management for taking necessary steps.	IFC – PS 1	Utilities are shared between the IWMF and landfill site	<b>Client indicates that landfill site does not contain any existing public utility lines – no documentation</b>
2.	<b>Compensatory plantation of trees</b>	Where ever applicable, compensatory plantation of at least twice the number of trees felled should be planted within the identified buffer area surrounding the landfill	IFC – PS 6	Tree cutting not required	<b>No documentation – visuals of site prior to construction and post – construction need to be maintained at every</b>

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					stage to provide evidence. Client shall make visual record of critical events henceforth.
3.	<b>Removal and Stockpiling Top soils</b>	<p>Prior to excavation to desired depth for placing the landfill liner material, the topsoil is to be scraped out stockpiled adjacent to the landfill footprint. This topsoil can be used as the final landfill cover material. The client shall identify the stockpile site prior to start of the earthworks; taking into account the following</p> <ul style="list-style-type: none"> <li>• (a) The stockpile does not impact natural drainage courses</li> <li>• (b) Appropriate soil erosion and dust control measures are taken</li> </ul>	IFC – PS 1	Excavated soil being used as top cover – on-site verification	<b>Excavated soil is being used as top soil and also to stabilize side slopes. Appropriate erosion control mechanisms should be in place before monsoon season</b>
4.	<b>Planning for Temporary Traffic Diversions</b>	<ul style="list-style-type: none"> <li>• Before taking up of construction activity, a Traffic Control Plan, as necessary, shall be devised and implemented</li> <li>• Movement of large trucks carrying long rolls of liner material and trucks carrying clay for the landfill base should be planned during non peak traffic hours (late evenings and night)</li> <li>• The arrangement for the temporary diversion of the road shall ensure to minimize the environmental impacts, like loss of vegetation, productive lands etc., prior to the finalization of diversion and detours.</li> <li>• Special consideration will be given to the preparation of the traffic control plan for safety of pedestrians and workers at night.</li> <li>• The client will ensure that the diversion / detour is always maintained, particularly during the monsoon to avoid disruption to traffic flow. He shall inform local community of changes to</li> </ul>	IFC –PS 1, 2, 3 & 4	Traffic is being managed by security personnel. Special training is planned to the personnel to comply with IFC standards.	<b>Traffic plan during various stages of construction should be prepared on a site specific basis. Evidence of training should be made available.</b>



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		<p>traffic routes, conditions and pedestrians access arrangements.</p> <ul style="list-style-type: none"> <li>• This plan shall be periodically reviewed with respect to site conditions.</li> <li>• The temporary traffic detour shall be kept free of dust by frequent application of water.</li> </ul>			
5.	<b>Excavation to Designed Depth</b>	<ul style="list-style-type: none"> <li>• The client must ensure that the excavation proceeds to desired depth and prepare the base for laying the liner materials.</li> <li>• After reaching desired depth, the base of the pit is to be compacted and leveled for placing the liner material</li> </ul>	MSW Rules 2000, World Bank sectoral EHS guidelines	Excavation design depth details shall be provided	<b>Site specific details not furnished – based on differing ground water depths and soil strength all sites, cannot have similar depths and slopes. Design documents showing site layout and side slopes are the same for all sites.</b>
6.	<b>Stockpiling Excavated Soils</b>	<ul style="list-style-type: none"> <li>• The excavated soils are to be stockpiled adjacent to the proposed landfill footprint for use as daily cover material during the period of landfill operation.</li> <li>• The client shall identify the stockpile site prior to start of earthworks; considering the following: <ul style="list-style-type: none"> <li>(a) The stockpile does not impact natural drainage courses</li> <li>(b) Appropriate soil erosion and dust control measures are taken</li> </ul> </li> </ul>	IFC – PS1, 3	Excavated soil being used as top cover – on-site verification	<b>Excavated soil is being used as top soil and also to stabilize side slopes. Appropriate erosion control mechanisms should be in place before monsoon season</b>
7.	<b>Flooding in the low lying areas</b>	Low lying areas in the project site can get flooded during monsoon period, to prevent the situation proper drainage arrangements have to be planned.	IFC – PS 1 & 3	Stormwater drains are in the process of being constructed and shall be completed before monsoon	<b>Design of stormwater drains is not provided for verification</b>
8.	<b>Temporary flooding due to excavation.</b>	• To avoid / minimize flooding impacts of excavated areas, the landfill construction may be planned during dry months.	IFC – PS 1 & 3	--	<b>No such arrangements in place in any of the sites. Dry weather stagnation</b>

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		<ul style="list-style-type: none"> <li>• Proper drainage and pumping arrangements are to be made, to avoid flooding during excavation. Any water pumped from the excavation must be diverted to a temporary storm water pond for the settlement of silt prior to discharging to nearby nallah/water course in line with competent authority guidelines.</li> </ul>			<b>of water is seen in Jalgaon.</b>
9.	<b>Prevention of accidents</b>	Prevention of accidents involving human beings, animals or vehicles falling or accidents due to open trenches/manholes during construction period. This needs to be ensured with proper barricading, signage boards and lighting etc.	IFC – PS 1, 2 & 3	Personnel are trianed on safe working and will be given refresher training every 3 months	<b>Appropriate records not furnished</b>
10.	<b>Barricading site</b>	The construction site should be barricaded at all times with adequate marking, flags, reflectors etc. for safety of general traffic movement and pedestrians.	IFC – PS 1, 2	The site is within the premises of the processing plant and is bounded on all 4 sides by a compound wall	<b>Needs to be addressed at access to and perimeter of the landfill site</b>
11.	<b>Dust Pollution near settlements</b>	<ul style="list-style-type: none"> <li>• All earthworks will be protected to minimize generation of dust. Area under construction shall be adequately screened.</li> <li>• Construction material shall be covered or stored in such a manner so as to avoid being affected by wind.</li> <li>• Unpaved haul roads near / passing through residential and commercial areas to be watered down.</li> <li>• Trucks carrying construction material to be adequately covered to avoid dust pollution and material spillage.</li> </ul>	IFC - PS 1, 2,3 & 4	--	<b>At Nagpur and Pune sites necessity for dust control measures was very evident. All site roads need to be kept clean and measures taken to prevent dust pollution from the site.</b>
12.	<b>Protection of residential / sensitive receptors.</b>	<ul style="list-style-type: none"> <li>• Noisy construction operations in residential and sensitive areas should be done only between 7.30 am and 6.00 pm.</li> <li>• Preventive maintenance of construction equipment and vehicles to meet emission standards and to keep them with low noise.</li> </ul>	IFC - PS 1, 2,3 & 4	Adequate steps being taken to prevent noise pollution	<b>Where residential areas are present near the site, adequate dust and noise control measures have to be implemented</b>

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		<ul style="list-style-type: none"> <li>• Provision of enclosing generators and concrete mixers at site.</li> <li>• Sound barriers in inhabited areas shall be installed during the construction phase.</li> <li>• Adequate barricading / other measures to protect dust pollution near sensitive receptors like schools and hospital etc to be ensured.</li> </ul>			
13.	<b>Vehicular noise pollution at residential / sensitive receptors.</b>	<ul style="list-style-type: none"> <li>• Idling of temporary trucks or other equipment should not be permitted during periods of loading / unloading or when they are not in active use. The practice must be ensured especially near residential / commercial / sensitive areas.</li> <li>• Stationary construction equipment will be kept at least 500m away from sensitive receptors.</li> <li>• All possible and practical measures to control noise emissions during drilling shall be employed.</li> </ul>	IFC - PS 1, 2,3 & 4	Adequate steps being taken to prevent noise pollution	<b>Adequate training to be given to operators and recorded</b>
14.	<b>Noise from vehicles, plants and equipments</b>	<ul style="list-style-type: none"> <li>• Servicing of all construction vehicles and machinery will be done regularly and during routine servicing operations, the effectiveness of exhaust silencers will be checked and if found defective will be replaced.</li> <li>• Maintenance of vehicles, equipment and machinery shall be regular to keep noise levels at the minimum.</li> </ul>	IFC - PS 1, 2,3 & 4	There is a preventive maintenance plan in place for all equipment in the processing plant and shall be extended to the landfill facilities. There is also a maintenance schedule for vehicles	<b>Same shall be extended to vehicles being operated in the landfills – whether owned or contracted</b>
15.	<b>Storage of construction materials</b>	Site for storage of pipes and construction materials to be identified, without affecting the traffic and other common utilities.	IFC - PS 1 & 3	Construction material stored within the premises of processing plant	<b>Material like HDPE lining and pipes to be appropriately stored and storage areas to be earmarked away from vehicle movement areas. Currently material is being stored in an adhoc</b>

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					<b>manner.</b>
16.	<b>Labour-camp &amp; facilities</b>	<ul style="list-style-type: none"> <li>• Setting up of labour camps needs to be done as per the procedures.</li> <li>• The location, layout and basic facility provision of each labour camp shall be well defined</li> <li>• The client shall construct and maintain all labour accommodation in such a fashion that uncontaminated water is available for drinking, cooking and washing.</li> <li>• Supply of sufficient quantity of potable water (as per IS) in every workplace/labor camp site at suitable and easily accessible places and regular maintenance of such facilities.</li> <li>• The sewage system for the camp is to be designed, built and operated in such a fashion that no health hazards occurs and no pollution to the air, ground water or adjacent water courses take place. Ensure adequate water supply is to be provided in all toilets and urinals.</li> </ul>	IFC – PS 1, 2 & 3	Labourers are provided accommodation at the staff quarters built within/near the processing facility	<b>Adequate drinking water and hygienically maintained toilet facilities are to be provided.</b>
17.	<b>Waste Disposal</b>	<ul style="list-style-type: none"> <li>• Garbage bins shall be provided in the camps and it is to be ensured that these are regularly emptied and disposed off in a hygienic manner as per applicable guidelines. .</li> </ul>	IFC – PS 1,2 & 3	Adequate facilities provided	<b>Bins need to be appropriately sized and placed at accessible locations</b>
18.	<b>Clearing of construction camps and restoration</b>	<ul style="list-style-type: none"> <li>• Client shall prepare site restoration plans and shall implement prior to demobilization.</li> <li>• On completion of the works, all temporary structures will be cleared away, all rubbish cleared, excreta or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy.</li> </ul>		No temporary camps constructed as accommodation is provided at the staff quarters	<b>Site restoration plan has to be in place for the larger landfill site.</b>
19.	<b>Pollution from fuel and lubricants</b>	<ul style="list-style-type: none"> <li>• The Client shall ensure that all construction vehicle parking locations, fuel/lubricants storage sites, vehicle, machinery and equipment maintenance and refueling sites shall be located</li> </ul>	IFC – PS 3	The waste is collected and stored in the hazardous storage room and is disposed off to certified	<b>Such storage sites to be appropriately located and appropriate signage and maintenance to be</b>

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		<p>away from surface water bodies and storm water management facilities located onsite.</p> <ul style="list-style-type: none"> <li>• Client shall ensure that all vehicle/machinery and equipment operation, maintenance and refueling will be carried out in such a fashion that spillage of fuels and lubricants does not contaminate the ground.</li> <li>• Client shall arrange for collection, storing and disposal of oily wastes to the pre-identified disposal sites</li> <li>• All spills and collected petroleum products will be disposed off in accordance with MoEF and state PCB guidelines</li> </ul>		waste processors	<b>ensured</b>
20.	<b>Pollution from construction wastes</b>	<ul style="list-style-type: none"> <li>• Client shall take all precautionary measures to isolate water from coming into contact with the municipal solid waste during construction and prevent such waters from entering into streams and water bodies.</li> <li>• All water coming into contact with the municipal waste is to be collected and disposed off in the leachate treatment plant, based on applicable standards</li> </ul>		Stormwater drains are under construction and will be complete before monsoon	<b>Has been observed that run-on from site flows into the landfill pit (Mangalpur and Salem) – other sites also do not have appropriate storm water control facilities. Appropriate linkage of storm drain system to leachate treatment plant is to be provided.</b>
21.	<b>Risk from electrical equipment(s)</b>	<p>The client shall take all required precautions to prevent danger from electrical equipment and ensure that:</p> <ul style="list-style-type: none"> <li>• No material will be so stacked or placed as to cause danger or inconvenience to any person or the public.</li> <li>• All necessary fencing and lights will be provided to protect the public in construction zones.</li> <li>• All machines to be used in the construction will</li> </ul>	IFC PS 1,2&3	Addressed	<b>Appropriate records of machinery and material stock and storage should be maintained</b>

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		conform to the relevant Indian Standards (IS) codes, will be free from patent defect, will be kept in good working order, will be regularly inspected and properly maintained as per IS provision.			
22.	<b>Safety Aspects</b>	<ul style="list-style-type: none"> <li>• Adequate precautions shall be taken to prevent accidents from various machines in use. All machines used shall conform to the relevant Indian standards Code and shall be regularly inspected</li> <li>• Where loose soil is met with, shoring and strutting shall be provided to avoid collapse of soil.</li> <li>• Protective footwear and protective goggles to all workers employed on mixing of materials like cement, concrete etc.</li> <li>• Welder's protective eye-shields shall be provided to workers who are engaged in welding works.</li> <li>• Earplugs shall be provided to workers exposed to loud noise, and workers working in crushing, compaction, or concrete mixing operation.</li> <li>• The client shall supply all necessary safety appliances such as safety goggles, hard hats, safety belts, ear-plugs, mask etc to workers and staff.</li> <li>• The client will comply with all the precautions as required for ensuring the safety of the workmen as per the International Labor Organization (ILO) Convention No. 62 as far as those are applicable to this contract.</li> <li>• The client will make sure that during the construction work all relevant provisions of the Factories Act, 1948 and the Building and other Construction Workers (regulation of</li> </ul>	IFC PS 1 & 2, Factories Act 1948, ILO Convention No 62	The safety aspects of the EMP for processing facilities is extended to the landfills and is being monitored by the EHS team	<b>Landfill specific ESMS has to be developed and site specific issues to be addressed.</b>

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		Employment and Conditions of Services) Act, 1996 are adhered to. • The client shall not employ any person below the age of 14 years for any work and no woman will be employed on the work of painting with products containing lead in any form.			
23.	<b>First Aid</b>	The client shall arrange for: • A readily available first aid unit including an adequate supply of sterilized dressing materials and appliances as per the Factories Rules in every work zone • Availability of suitable transport at all times to take injured or sick person(s) to the nearest hospital	IFC PS – 1 & 2	Standard first aid boxes are maintained at the facility	<b>To be maintained with appropriate material, at a location accessible to workers and replenished regularly.</b>
<b>II Landfill Base Liner Placement</b>					
24.	<b>Landfill Base Preparation</b>	• Landfill base preparation plan has to be prepared as part of the detailed engineering drawings	World Bank sectoral guidelines	Detailed design document will be shared	<b>Base preparation contours are not available for all sites, other than Mangalpur. Available data does not confirm that the soil has not been compacted adequately</b>
25.	<b>Clay Liner Placement</b>	• Site for storage of construction materials to be identified, without affecting near by the residents, traffic and other common utilities. • It is suggested that the clay material used meet the following requirements: o Modified proctor density: 95% o Moisture content: 5-7% o Clod size: Approximately 2.5 cm	World Bank sectoral guidelines & MSW Rules 2000	Available data does not confirm that the soil has not been compacted adequately	<b>Clay liner testing is not evident anywhere, other than Mangalpur and Faridabad.</b>
26.	<b>Geomembrane Placement</b>	• A 2mm thick HDPE liner is to be laid over the clay liner to prevent any infiltration of leachate into the clay layer below.	World Bank sectoral guidelines & MSW Rules 2000		<b>1. The final fill height is not available to assure that the 1.5mm</b>

Sl. No	Scope	Suggested Measures as per AESR	Applicable regulation/ standard/ guideline	Verification Documentation (to be filled in by the client)	Audit Observation/Remarks
		<ul style="list-style-type: none"> <li>The sub base must not contain any particles greater than 1.25 cm in order to prevent damage to the geomembrane. A herbicide should be used on the sub base below the synthetic membrane to inhibit vegetative growth.</li> <li>Under no circumstances, should vehicles be allowed to operate on the liner directly. Only the seaming equipment, seam testing equipment and necessary minimum number of personnel should be allowed on the liner.</li> <li>The geomembrane could be sensitive to UV radiation; hence exposed parts of the liner should be covered with tarpaulin, to prevent any damage.</li> </ul>			<p>liner is sufficient.</p> <p>2. The liner is exposed at most places and vehicle tyre marks are clearly visible. The liner is damage at most places because of this</p> <p>3. All liner material is exposed to sunlight and is already found to be brittle</p>
27.	Noise level	<ul style="list-style-type: none"> <li>Noise screening by trees plantation scheme proposed as noise barriers.</li> <li>Adequacy of measures shall be checked to control noise pollution.</li> <li>Using of less noise generating machineries like submersible pumps at Pumping Stations / Leachate Sump sites to reduce the noise level.</li> <li>Increase the height of compound wall of the PS/LS site.</li> </ul>	World Bank sectoral guidelines	Steps are taken to keep noise levels at a minimum	Maintaining of a site boundary an adequate green belt is required
28.	Construction of clay berms	<ul style="list-style-type: none"> <li>Clay berm is to be constructed at the end of each phase to prevent runoff entering into the sub cell during monsoon season.</li> </ul>	World Bank sectoral guidelines	Detailed design document is shared	Not evident from drawings – needs to be implemented
<b>Construction Of Leachate Collection System</b>					
29.	Components of Leachate collection system	<ul style="list-style-type: none"> <li>The leachate collection system (LCS) consists of three main components; a drainage layer, a series of collector pipes, and a non-woven geotextile separator layer.</li> <li>The leachate collection system and it's components should be laid over the HDPE geomembrane.</li> <li>The LCS layer typically consists of a 30 cm</li> </ul>		Detailed design document is shared	1. The construction as seen at site is not correct. The perforations of LCS pipes are inadequate, sealing is not complete and the geotextile employed



Sl. No	Scope	Suggested Measures as per AESR	Applicable regulation/ standard/ guideline	Verification Documentation (to be filled in by the client)	Audit Observation/Remarks
		thick gravel drainage layer of 25-50mm sized rounded gravel and perforated HDPE pipes embedded in this gravel layer.			<p>cannot assure protection to the liner.</p> <p>2. Design details of LCS system are not adequate</p> <p>3. Graded gravel is not used in the site</p>
30.	<b>Slopes for the Leachate Collecting System</b>	Appropriate slopes shall be maintained to prevent clogging		Design details of LCS system are not provided	<p>1. Design details of LCS system are not adequate to ascertain the same</p> <p>2. Pipes are sinusoidal in elevation -</p>
31.	<b>Leachate Collection Pipes Network</b>	<ul style="list-style-type: none"> <li>Typically, the leachate collection piping network system consists of two parts, a network of leachate collection pipes and a LCS sump. The LC pipes are embedded in the leachate collection layer of the liner.</li> <li>The pipe network consists of a series of lateral pipes,</li> <li>The header pipes run along the length of the landfill and are connected to a collector pipe which is drawn out of the base liner and is connected to the inflow side of the LCS sump. Along with the header pipes, some of the lateral pipes should be attached to clean out pipes to prevent clogging</li> </ul>		Design details of LCS system are not provided	<p>1. Lateral pipes are missing in 6 of 7 constructed sites.</p> <p>2. Connection of header pipe to leachate sump is not appropriate</p> <p>3. Connection of leachate sump to treatment plant is not as per design and not evident.</p> <p>4. Lateral cleanouts are not provided in any of the sites</p> <p>5. There are no leachate barriers in the leachate collection sump. The height of the well is unclear in the designs, The wells are terminated at various depths in</p>

Sl. No	Scope	Suggested Measures as per AESR	Applicable regulation/ standard/ guideline	Verification Documentation (to be filled in by the client)	Audit Observation/Remarks
					many project and is not consistent with the drawings
<b>Construction of Storm water Management Facilities</b>					
32.	<b>Storm water Management Trench</b>	<ul style="list-style-type: none"> <li>The landfill cover system is to be designed to minimize infiltration into the waste. The top two cover layers – the top soil and the drainage layer should drain into the peripheral stormwater drains, to be built along all the sides of the landfill around the perimeter.</li> <li>Typically, these trenches are trapezoidal channels reinforced with dry revetment (riprap) on the side slopes and have native soil at the base, to promote growth of grass.</li> <li>The stormwater trenches drain runoff only from the landfill area and open into the proposed stormwater management pond. the system should be designed to handle the discharge from a 24-hour, 25-year storm.</li> </ul>		Design details are provided	<ol style="list-style-type: none"> <li>Such storm water trench details are not evident in the design.</li> <li>Top cover design is not as per MSW rules</li> <li>Storm water retention ponds are not part of the design</li> </ol>
33.	<b>Storm water detention pond</b>	<ul style="list-style-type: none"> <li>The stormwater trenches drain surface runoff of water that does not come in contact with the waste into a stormwater management pond.</li> <li>The proposed pond is to be appropriately lined. Runoff is typically treated together with leachate from the site.</li> </ul>		Design details are provided	<ol style="list-style-type: none"> <li>Such storm water trench details are not evident in the design.</li> </ol>
<b>Top Cover Placement</b>					
34.	<b>Preparation of a Closure Plan</b>	Development of a closure plan which specifies the necessary environmental objectives and controls (Including technical specifications), future land use (as defined in consultation with local communities and government agencies), closure schedule, financial resources, and monitoring arrangements	World Bank Sectoral Guidelines	Design details are provided	<ol style="list-style-type: none"> <li>Closure plan not evident</li> <li>The SLF filling sequence is not ensuring minimised exposed areas</li> </ol>
35.	<b>Daily Cover for the landfill</b>	Wastes should be covered immediately or at the end of each working day with minimum 10 cm of	MSW Management & Handling Rules 2000	A cover of 10 cm is laid after every 2 ft deep layer	<ol style="list-style-type: none"> <li>Unclear in the SOP</li> <li>Varying practices</li> </ol>

Sl. No	Scope	Suggested Measures as per AESR	Applicable regulation/ standard/ guideline	Verification Documentation (to be filled in by the client)	Audit Observation/Remarks
		soil, inert debris or construction material.		of inerts	<b>observed in different sites</b> <b>3. Daily cover being used to stabilize base of the site in Faridabad.</b>
36.	<b>Intermediate cover during monsoon season</b>	Prior to the commencement of monsoon season, an intermediate cover of 40-65 cm thickness of soil should be placed on the landfill with proper compaction and grading to prevent infiltration during monsoon.	MSW Management & Handling Rules 2000	Will be followed during monsoons since all the landfilled sites have begun operational after monsoons	<b>Needs to be specified in the SOP</b>
37.	<b>Final cover</b>	The final cover shall meet the following specifications, namely <ul style="list-style-type: none"> <li>• The final cover shall have a barrier soil layer comprising of 60 cms of clay or amended soil with permeability coefficient less than <math>1 \times 10^{-7}</math> cm/sec.</li> <li>• On top of the barrier soil layer there shall be a drainage layer of 15 cm.</li> <li>• On top of the drainage layer there shall be a vegetative layer of 45 cm to support natural plant growth and to minimize erosion.</li> </ul>	MSW Management & Handling Rules 2000	Final cover will be done as per the MSW rules 2000 once the landfill is complete	<b>Final height of the landfill, closing contours and final cover design to be specified</b>
<b>General requirements of landfill construction phasing</b>					
38.	<b>Specifications for Landfill Construction</b>	The following Specifications have to be followed for the construction of Landfill <ul style="list-style-type: none"> <li>• Integrating the base clay liner with the clay barrier layer in the top cover.</li> <li>• Preparation of a granular blanket layer as per dimensions suggested in engineering drawings. This layer is an extension to the drainage layer of the LCS system along the side slopes of the base. This granular blanket layer is required to prevent the entry of any rainfall runoff into the waste layers from the periphery of the landfill.</li> </ul>	MSW Management & Handling Rules 2000	Design details are provided	<b>Such details are not discernible in provided drawings – to be strictly adhered to</b>

Sl. No	Scope	Suggested Measures as per AESR	Applicable regulation/ standard/ guideline	Verification Documentation (to be filled in by the client)	Audit Observation/Remarks
		<ul style="list-style-type: none"> <li>Tucking in the geotextile and HDPE liner into the trench located along the periphery of the landfill, till the top cover is built. Once the top cover is being placed, the HDPE liner will remain in the trench, but the geotextile will be turned in and taken below the gravel layer of the gas-venting layer.</li> </ul>			
39.	<b>LCS Phasing</b>	<ul style="list-style-type: none"> <li>The LCS will also need to be constructed phase wise, until such time till the entire base is prepared.</li> <li>The LCS pipes are to be embedded in the granular drainage layer of the base and at the limit of each phase these pipes should be closed with end caps.</li> <li>The network of pipes in each phase should be provided with a pair of cleanouts, which extend along the slope of the base and are taken above ground level and are to be provided with end caps.</li> </ul>	MSW Management & Handling Rules 2000	Design details are provided	<b>Phase-wise planning not evident. LCS design details are not complete.</b>
40.	<b>SWM Phasing</b>	The SWM system will also be built phase wise, till the base preparation is completed.	MSW Management & Handling Rules 2000	Design details are provided	<b>Phase-wise planning not evident. Storm water trenches (on-site trenches and landfill peripheral trenches) have to be designed according to rainfall conditions and site specific conditions.</b>

### C. LANDFILL OPERATIONS

Sl. No	Scope	Suggested Measures	Applicable regulation/ standard/ guideline	Verification Documentation (to be filled in by the client)	Audit Observation/Remarks
1.	Facilities at the landfill site	<ul style="list-style-type: none"> <li>Landfill site shall be fenced or hedged and provided with proper gate to monitor incoming vehicles or other modes of transportation.</li> <li>The landfill site shall be well protected to prevent entry of unauthorized persons and stray animals.</li> <li>Approach and other internal roads for free movement of vehicles and other machinery shall exist at the landfill site.</li> <li>The landfill site shall have wastes inspection facility to monitor wastes brought in for landfill, office facility for record keeping and shelter for keeping equipment and machinery including pollution monitoring equipments.</li> <li>Provisions like weigh bridge to measure quantity of waste brought at landfill site, fire protection equipments and other facilities as may be required shall be provided.</li> <li>Utilities such as drinking water (preferably bathing facilities for workers) and lighting arrangements for easy landfill operations when carried out in night hours shall be provided.</li> <li>Safety provisions including health inspections of workers at landfill site shall be periodically made.</li> </ul>	MSW Management & Handling Rules 2000	Facilities as per the requirements of the MSW rules are provided at the sites	Following aspects need attention: <ol style="list-style-type: none"> <li>Site boundary wall to be constructed</li> <li>Traffic control plan and storage of material plan to be strengthened</li> <li>Provision of hygienic drinking water and accessible and hygienic sanitation facilities to be strengthened</li> <li>Waste filling quantity records to be maintained</li> <li>Employee health and safety records are to be maintained</li> </ol>
2.	Specifications for landfilling	<ul style="list-style-type: none"> <li>Wastes subjected to land filling shall be compacted in thin layers using landfill compactors to achieve high density of the wastes. In high rainfall areas where heavy compactors cannot be used alternative measures shall be adopted.</li> <li>Wastes shall be covered immediately or at the end of each working day with minimum 10 cm of soil, inert debris or construction material till such time waste processing facilities for composting or recycling or energy recovery are set up as per Schedule I.</li> <li>Prior to the commencement of monsoon season, an intermediate cover of 40-65 cm thickness of soil shall be placed on the landfill</li> </ul>	MSW Management & Handling Rules 2000	Done as per the SOP for landfilling prepared by Hanjer which is shared with ICLEI already	The SOP needs to be strengthened to address all issues mentioned here

Sl. No	Scope	Suggested Measures	Applicable regulation/ standard/ guideline	Verification Documentation (to be filled in by the client)	Audit Observation/Remarks
		<p>with proper compaction and grading to prevent infiltration during monsoon.</p> <ul style="list-style-type: none"> <li>• Proper drainage berms shall be constructed to divert run-off away from the active cell of the landfill.</li> <li>• After completion of landfill, a final cover shall be designed to minimize infiltration and erosion.</li> </ul>			
3.	<b>Litter Management</b>	<ul style="list-style-type: none"> <li>• Avoid siting of facilities in particularly exposed, windy areas</li> <li>• Provide perimeter planting, landscaping, or fences to reduce wind;</li> <li>• Pin waste by use of dozers and landfill compactors immediately after discharge from the vehicles delivering the waste;</li> <li>• Use soil or artificial cover materials so that deposited waste is held in place. More frequent application of cover may be required during high winds or in exposed areas;</li> <li>• Use scaring techniques or natural predators to control scavenging birds;</li> <li>• Provide an emergency tipping area/foul weather cell for lightweight wastes such as paper;</li> <li>• Construct temporary banks and bunds immediately adjacent to the tipping area, install strategically placed mobile catch fences close to the tipping area or on the nearest downwind crest, and/or fully enclose of the tipping area within a mobile litter net system;</li> <li>• Install wind fencing upwind of the tipping area to reduce the wind strength as it crosses the facility ;</li> <li>• Temporarily close the facility to specific or all waste or vehicle types when weather conditions are particularly adverse.</li> </ul>	<b>World Bank Sectoral Guidelines</b>	<b>NA as per the MSW rules but steps will be initiated to comply with the World Bank guidelines</b>	<b>Needs compliance</b>
4.	<b>Dust &amp; Odour control</b>	<ul style="list-style-type: none"> <li>• Compact and cover waste promptly after discharge from the vehicle delivering the waste</li> <li>• Minimize open tipping face area</li> <li>• Dispose of odorous sludge in covered trenches</li> <li>• Restrict acceptance of loads known to be particularly odorous material</li> <li>• Restrict tipping activities during periods of adverse weather (e.g., wind toward sensitive receptors)</li> </ul>	<b>World Bank Sectoral Guidelines</b>	<b>Done as per the SOP for landfilling prepared by Hanjer which is shared with ICLEI already</b>	<b>SOP needs to be strengthened with aspects mentioned here</b>

Sl. No	Scope	Suggested Measures	Applicable regulation/ standard/ guideline	Verification Documentation (to be filled in by the client)	Audit Observation/Remarks
		<ul style="list-style-type: none"> <li>Seal sump covers</li> <li>Aerate leachate storage areas</li> </ul>			
5.	<b>Storm water management</b>	<ul style="list-style-type: none"> <li>Diversion of storm water drains to minimize leachate generation and prevent pollution of surface water and also for avoiding flooding and creation of marshy conditions;</li> <li>Construction of a non-permeable lining system at the base and walls of waste disposal area.</li> <li>Provision of temporary bunds on active filling area, diverting runoff into the perimeter drain before it flows over the waste</li> </ul>	<b>World Bank Sectoral Guidelines &amp; MSW Management &amp; Handling Rules 2000</b>	<b>Design details are provided</b>	<b>Design needs to be strengthened by considering these aspects</b>
6.	<b>Prevent, minimize &amp; control leachate generation</b>	<ul style="list-style-type: none"> <li>Site landfills in areas with stable geology and avoid siting near particularly vulnerable or sensitive ecosystems and groundwater and surface water resources</li> <li>Design and operate the landfill in accordance with applicable national requirements and internationally recognized standards to minimize leachate generation, including the use of low-permeability landfill liners to prevent migration of leachate as well as landfill gas, a leachate drainage and collection system, and landfill cover (daily, intermediate, and final) to minimize infiltration</li> <li>Treat leachate onsite and/or discharge to municipal wastewater system. Potential treatment methods include aerated lagoons, activated sludge, anaerobic digestion, artificial wetlands, recirculation, membrane filtration, ozone treatment, peat beds, sand filters, and methane stripping</li> <li>Minimize the daily exposed working face and use perimeter drains and landfill cell compaction, slopes and daily cover materials to reduce infiltration of rainfall into the deposited waste</li> </ul>	<b>World Bank Sectoral Guidelines &amp; MSW Management &amp; Handling Rules 2000</b>	<b>Design details are provided</b>	<ol style="list-style-type: none"> <li>Leachate treatment plant details not given.</li> <li>In sites where high water table is seen, adequate safeguards have to be put in place</li> </ol>
7.	<b>Leachate management</b>	<ul style="list-style-type: none"> <li>For landfill receiving residues of waste processing facilities or mixed waste or waste having contamination of hazardous materials (such as aerosols, bleaches, polishes, batteries, waste oils, paint products and pesticides) minimum liner specifications shall be a composite barrier having 2 mm high density polyethylene (HDPE) geomembrane, or equivalent, overlying 90 cm of soil (clay or amended soil) having permeability coefficient</li> </ul>	<b>MSW Management &amp; Handling Rules 2000</b>	<b>Design details are provided</b>	<ol style="list-style-type: none"> <li>Groundwater table should be below 2mtrs from base – Jalgaon and Vasai Virar</li> <li>No evidence of Clay liner compacted in</li> </ol>

Sl. No	Scope	Suggested Measures	Applicable regulation/ standard/ guideline	Verification Documentation (to be filled in by the client)	Audit Observation/Remarks
		<p>not greater than <math>1 \times 10^{-7}</math> cm/sec.</p> <ul style="list-style-type: none"> <li>The highest level of water table shall be at least two meter below the base of clay or amended soil barrier layer;</li> <li>Ensuring that the clay liner is compacted according to CPCB design specifications</li> <li>Provisions for management of leachates collection and treatment shall be made. The treated leachates shall meet the standards specified in Schedule- IV of MSW Rules 2000</li> <li>Prevention of run-off from landfill area entering any stream, river, lake or pond.</li> </ul>			<p>layers</p> <p><b>3. Leachate management system needs to be substantially strengthened</b></p> <p><b>4. Storm water management needs to be strengthened</b></p>
8.	Carbon Financing	<ul style="list-style-type: none"> <li>Carbon financing may also be considered, including opportunities implemented through the CDM framework of the United Nations Network Convention on Climate Change.</li> </ul>	World Bank Sectoral Guidelines	Hanjer is presently enjoying VERs from its processing facilities and the same will be extended to the landfills	Adequate documentation and records need to be generated and maintained for the purpose
9.	Truck wash area	<ul style="list-style-type: none"> <li>Provision of truck wash water collection, oil and water separator and sedimentation sump, disposal of piped wash water into solar evaporation beds, after ensuring appropriate compliance of water quality with surface water disposal standards</li> </ul>	IFC – PS 3	Not required as trucks do not go outside the premises	If truck/tyre wash area is not provided – other dust control measures like watering own roads have to be practiced
10.	Temporary waste storage area / Tipping floor	<ul style="list-style-type: none"> <li>Regulating waste unloading during periods of high wind velocities</li> <li>Spraying water on the waste in instances where the waste is in dry form</li> <li>Covering all wastes with a protective tarpaulin</li> <li>The temporary waste storage area is to be covered with a roof with no scope of exposure to rain water.</li> <li>It is to be designed to contain the wastes and separate holding areas are to be designed for incompatible wastes.</li> </ul>	IFC PS – 3	Design details are shared	No temporary waste storage area is planned
11.	Landfill Closure & Post Care	<ul style="list-style-type: none"> <li>The post-closure care of landfill site shall be conducted for at least fifteen years and long term monitoring or care plan shall consist of the following, namely: -                             <ul style="list-style-type: none"> <li>o Maintaining the integrity and effectiveness of final cover,</li> </ul> </li> </ul>	MSW Management & Handling Rules 2000	Design details are shared	All aspects mentioned here have to be addressed



Sl. No	Scope	Suggested Measures	Applicable regulation/ standard/ guideline	Verification Documentation (to be filled in by the client)	Audit Observation/Remarks
		<p>making repairs and preventing run-on and run-off from eroding or otherwise damaging the final cover;</p> <ul style="list-style-type: none"> <li>○ Monitoring leachate collection system in accordance with the requirement;</li> <li>○ Monitoring of ground water in accordance with requirements and maintaining ground water quality;</li> <li>○ Maintaining and operating the landfill gas collection system to meet the standards.</li> </ul> <p>• Use of closed landfill sites after fifteen years of post-closure monitoring can be considered for human settlement or otherwise only after ensuring that gaseous and leachate analysis comply with the specified standards.</p>			
12.	<b>Flora and chance found fauna</b>	<ul style="list-style-type: none"> <li>• The client will take reasonable precaution to prevent his workmen or any other persons from removing and damaging any flora (plant/vegetation) and fauna (animal) including fishing in any water body and hunting of any animal.</li> <li>• If any wild animal is found near the construction site at any point of time, the client will immediately upon discovery thereof acquaint the concerned forest office (range office or divisional office) and will take appropriate steps/ measures, if required in consultation with the forest officials.</li> </ul>	<b>IFC –PS 6</b>	<b>Not found</b>	<b>Not applicable</b>
13.	<b>Chance found archaeological property</b>	<ul style="list-style-type: none"> <li>• All fossils, coins, articles of value of antiquity, structures and other remains or things of geological or archaeological interest discovered on the site shall be the property of the Government and shall be dealt with as per provisions of the relevant legislation.</li> <li>• The client will take reasonable precautions to prevent his workmen or any other persons from removing and damaging any such article or thing. He will, immediately upon discovery thereof and before removal seek direction from the Archaeological Survey of India (ASI) before recommencing the work in the site.</li> </ul>	<b>IFC – PS 8</b>	<b>Not found</b>	<b>Not applicable</b>
14.	<b>Clearing of</b>	<ul style="list-style-type: none"> <li>• Client to prepare site restoration plans to be implemented before</li> </ul>	<b>IFC – PS 1</b>	<b>Not Applicable as the</b>	<b>Construction debris</b>

Sl. No	Scope	Suggested Measures	Applicable regulation/ standard/ guideline	Verification Documentation (to be filled in by the client)	Audit Observation/Remarks
	construction of camps and restoration	demobilization. • On completion of the works, all temporary structures will be cleared away, all rubbish cleared, excreta or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy.		accommodation is provided at the staff colony at our processing plants	from landfill site to be disposed off appropriately

#### D. MONITORING REQUIREMENTS AS PER AESR

Sl. No	Scope	Suggested Measures	Applicable regulation/ standard/ guideline	Verification Documentation (to be filled in by the client)	Audit Observation/Remarks
	Ambient Air Quality Monitoring	<ul style="list-style-type: none"> <li>• Installation of landfill gas control system including gas collection system shall be made at landfill site to minimize odour generation, prevent off-site migration of gases and to protect vegetation planted on the rehabilitated landfill surface.</li> <li>• The concentration of methane gas generated at landfill site shall not exceed 25 per cent of the lower explosive limit (LEL).</li> <li>• The landfill gas from the collection facility at a landfill site shall be utilized for either direct thermal applications or power generation, as per viability. Otherwise, landfill gas shall be burnt (flared) and shall not be allowed to directly escape to the atmosphere or for illegal tapping. Passive venting shall be allowed if its utilization or flaring is not possible.</li> <li>• Install and regularly sample boreholes surrounding the landfill to monitor for migration of landfill gas.</li> <li>• The ambient air quality monitoring shall be carried out by the concerned authority as per the following schedule, namely: -                             <ul style="list-style-type: none"> <li>○ Six times in a year for cities having population of more than fifty lakhs;</li> <li>○ Four times in a year for cities having population between ten and fifty lakhs;</li> <li>○ Two times in a year for town or cities having population between one and ten lakhs.</li> </ul> </li> </ul>	World Bank Sectoral Guidelines & MSW management & handling rules 2000	Ambient air monitoring reports have being shared with ICLEI wherever available and the ambient air monitoring will be done for landfills as well as per the frequency prescribed in the MSW rules 2000	<ol style="list-style-type: none"> <li>1. Ambient air quality reports are insufficient to evaluate the impact of the landfill site operations – since single point readings are taken at the factory gate.</li> <li>2. There is no evidence of a planned gas venting layer in the top cover and an appropriate gas collection system</li> <li>3. No means of ascertaining methane levels on the landfill site specifically, due to presence of historical waste dumps within the</li> </ol>

					<b>landfill boundary</b>
	<b>Ground Water &amp; Leachate Monitoring</b>	<ul style="list-style-type: none"> <li>• Measure and record the quantity and quality of leachate generated.</li> <li>• Install groundwater monitoring wells outside the landfill perimeter at locations and depths sufficient to evaluate whether leachate is migrating from the landfill into the uppermost groundwater unit. This groundwater monitoring network should usually include, at a minimum, one monitoring well located in the up - gradient groundwater flow direction from the landfill and two monitoring wells located in the down gradient direction.</li> <li>• Regularly sample the monitoring wells and analyze for constituents, selected based on applicable national standards</li> <li>• Usage of groundwater in and around landfill sites for any purpose (including drinking and irrigation) is to be considered after ensuring its quality according to ISO 10500: 1991 drinking water standards.</li> <li>• Quarterly ground water monitoring is to be carried out to cover different seasons in a year. The disposal of treated leachate shall follow standards specified under Schedule IV of MSW Rules 2000</li> </ul>	<b>World Bank Sectoral Guidelines &amp; MSW Management &amp; Handling Rules 2000</b>	<b>Ground water monitoring reports have being shared with ICLEI wherever available and the ground water monitoring will be done for landfills as well as per the frequency prescribed in the MSW rules 2000</b>	<b>Groundwater monitoring is ad-hoc currently and specified schedule needs to be followed</b>

## **PART B: EVALUATION OF RAJKOT DESIGN DOCUMENTATION**

HBEPL has furnished few of the design calculations and records available for the Rajkot Sanitary landfill project. Rajkot SLF was not part of the scope of the audit, but the auditors have been given to understand that Rajkot SLF designs would form the template for those that have been Audited namely- Pune, Nagpur, Vasai- Virar, Jalgaon, Faridabad, Agra, Mangalpur and Salem.

Accordingly, the same has been evaluated for the approach, possible deficiency and where possible correlation with sites actually audited. The comments have to be accepted on a holistic note and are not a comment on the Rajkot SLF.

### **I. SHEET1/3 – PROPOSED PLAN & SECTION OF LANDFILL CELL:**

1. There is no data on the quantum of inert generation from the Rajkot project, hence the design volume cannot be computed. Therefore the adequacy of the SLF capacity to cater to the concession period cannot be verified.
2. A ramp has been provided in the SLF. None of the sites visited showed evidence of geo-membrane liner, clay layer below ramp. This results in a discontinuity in the sealing system and therefore unacceptable as a engineered SLF.
3. The Solar Evaporation pond (SEP) design is based on the quantum of leachate generated which is a function of the exposed area, rainfall and evaporation data for the place. The adequacy of the Solar evaporation pond for Rajkot cannot be verified in the absence of these data. However, it may be noted that no provision for SEP has been made in any of the SLF audited in this contract
4. The SEP mineral liner should be 900mm thick with the same specification of the SLF. In Rajkot, the clay layer has been reduced in the slope portion.
5. The leachate drainage pipe is a function of the leachate generated (which is unknown) and therefore it is not possible to comment on the adequacy of the pipe diameter, number of drainage holes etc., for the reason cited above. The designer has to validate whether the 6kg/cm<sup>2</sup> pipe is sufficient to withstand the 9.0m of waste overburden and compaction machinery without getting distorted or damaged. It has been noticed that leachate pipe is placed in the concrete drain without a proper cradle which is going to adversely affect the dimension stability. The leachate pipes terminate at the bottom of the SLF and do not rise to the top. This prevents routine cleaning and de-clogging operation. The leachate pipe also did not have the mandatory end cap fitted to it.
6. The drawing shows a dyke constructed over the Natural Ground level. All of the SLF sites audited, except one (Agra), do not have this dyke. Thus the run-on of storm water into the SLF is not prevented. The drainage media has got washed to the center of the SLF, causing excess leachate generation and hampering normal operation due to soggy conditions.

### **II. Sheet 2 & 3/3: PROPOSED PLAN & SECTION OF LANDFILL CELL:**

1. Examination of the Plan & section of SLF indicates that leachate well is not provided with any geo-membrane liner and mineral liner sealing. This is another area of discontinuity and potential seepage of leachate contamination to ground water.

2. No calculation to show that the leachate well has been checked for stability against tilting and sliding is provided. The well is susceptible to these forces due to the overburden waste.
3. Inter connection details of leachate pipe, RC trench to well, are unavailable, and therefore the drawing does not assure proper sealing. The audited sites clearly show that no sealing has been provided between the drain and the leachate well and the geo-membrane from the bed and side slopes.
4. The final height of leachate well is not mentioned in any of the drawings and various heights were noticed at site. In some projects (Salem), the height has been terminated at 1.0m and finished with no rods left for future extensions. This is occurring due to lack of clarity in the drawings.
5. The adequacy of 500 GSM geotextile in protecting the geo-membrane is not validated
6. The anchorage distance of the geo-membrane is about 5.0m whereas, the actual distance is almost 0.3-1.0m only at each of the audited sites

### III. Municipal Solid Waste Standard Operation Manual

1. It is stated that the organic content would be measured on a daily basis. It is not available on site besides the waste dumped at the SLF show the presence of high content of organics.
2. The O&M indicates that the inert filling is done as per a defined sequence, which is also required to minimize leachate generation and soil cover. The filling actually carried out disregards this procedure. The waste is instead spread evenly across the SLF bottom.
3. SOP. 4(a) rightly states that leachate can be contaminated with heavy metals and other toxic ingredients and recommends an Solar Evaporation ponds to manage the leachate. Use of the leachate in spraying on to the waste heaps (which is currently practiced) , should therefore be clearly avoided.

### IV. Quality Assurance Plans

1. The number of permeability test as defined in QAP, for each of the layers have not been made available.
2. Soils which are predominantly coarse/ granular with less than 10% clay content are exhibiting very low permeability which is not practical.
3. Data showing higher permeability with increased bentonite content is also a glaring error.
4. Liners are being folded before being spread on the slopes, which is against the manufacturers recommendation.
5. Inspection of sites revealed that graded aggregates have not been used and instead only sand is provided, which reduces the permeability values and results in clogging eventually.
6. QAP 1.2- Some soil test show a high liquid limit of =132 which indicates a highly compressible soil. Similarly the Plastic limit is also very high -103 which should not be used as it is susceptible to high shrinkage
7. Similarly, the soil compaction has not been done in layers of 150mm as specified in the QAP, no records exists to substantiate. It was learnt that entire 900mm was laid and compacted in one layer, which is not acceptable. PI:4, Layer thickens 150 mm not maintained, no q tests - not adequate

### **PART C: CONCLUSIONS**

- HBEPL has to prepare a detailed ESMS for all its landfill facilities to address the IFC fund performance standards
- Adequate mechanisms should be in- place for recording, addressing and following up on community grievances
- Employee training and job-description should be given importance.
- SOPs should address each aspect of landfill design, construction and implementation
- Landfill location criteria should be adhered to, where not possible, adequate mitigation measures need to be implemented
- Each aspect of the landfill – base preparation, liner placement, waste placement, top-cover placement, gas collection systems, leachate management system and storm water management system has to be scientifically designed with adequate data and monitoring at various stages of design and construction.
- Monitoring mechanisms should be strengthened.

**ANNEXURES**  
**LANDFILL AUDIT DOCUMENTS**